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ESSENTIALS OF PHARMACY

BY
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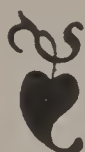
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MACON, GA.



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ESSENTIALS OF PHARMACY

LECTURE No. 1

Pharmacy is the art of preparing drugs in a form suitable for use as remedial agents.

Pharmacy is divided into two classes, Theoretical and Practical.

Practical Pharmacy treats of the methods, processes and operations in applying Theoretical Pharmacy.

Theoretical Pharmacy treats of the knowledge of the substances from the mineral, vegetable, and animal kingdoms.

Toxicology is the study of poisons, their source, chemical composition, actions and antidotes.

LECTURE No. 2

Oleoresins are mixtures of oils and resins obtained from plants. Those obtained direct from the plants are called natural oleoresins, and those made by percolating the drug with ether or alcohol are called prepared or *pharmaceutical oleoresins*, *ex oleoresin aspidium*.

Ether is used as a solvent for five U. S. P. Oleoresins. They are: *Aspidium*, *Capsicum*, *Ginger*, *Liquid Apiol*, and *Black Pepper*. *Alcohol* is used as a solvent for *Oleoresin Cubeb*. *Oleoresin Turpentine* and *Copaiba* are natural Oleoresins.

Oleoresin of Cubeb deposits on standing a substance which should be rejected before using, only the liquid portion being used.

Oleoresin of Aspidium deposits on standing a precipitate called *Filic Acid*, which is the active principle, and it should be thoroughly mixed before using. It is often called *Extractum Filicis* and is used for tape worms in 30 gr. doses, once daily.

Acetone was formerly used as a solvent for Oleoresins, but was replaced by ether in the U. S. P. ix.

Alkaloids: Their English names end in "ine" and their Latin names end in "ina." They are the active principles of plants and

are called chemically vegetable "*Alkalies*." They are composed of Carbon, Hydrogen, and Oxygen, and a distinctive feature is that they contain Nitrogen. They have an Alkaline reaction and unite with Acids to form their corresponding salts. In solution they will turn *Red Litmus* paper Blue. Their salts are more soluble than the Alkaloids themselves. Solid Alkaloids are called *Amides*. Example: Quinine, Morphine. Liquid Alkaloids are called *Amines*. Example: *Sparteine*.

Volatile Oils are also called Essential Oils, former because they will vaporize, and the latter because when dissolved in Alcohol a class of preparations called essences or spirits are formed. They are fresh colorless but on standing acquire various colors and odors. They are obtained from various parts of plants and usually constitute the odorous principle. When pure they will volatilize without leaving a greasy spot on paper. They are usually prepared by distillation or expression, but we have two made by macerating the drug in water and then distilling. Oils of Mustard and Bitter Almond.

Volatile Oils consist of two principles: *Liquid Principle* called *Eleoptein* and the Solid called *Stearoptein* or *Camphors*.

LECTURE No. 3

Balsams are gummy exudations from plants and must contain Benzoic or Cinnamic Acids. The true Balsams are Tolu and Peru, while Storax is an Oleoresinous Balsam.

Gums are exudations from plants and are distinguished from other products by being soluble in water. Example, Acacia.

Comminution is the process of powdering drugs by grinding.

Dessication is depriving drugs of their moisture by the aid of heat.

Cerates are a class of preparations for external use, having wax as a base. Three officials: Simple, Rosin, and Cantharidal.

Ointments are fatty preparations intended for external use, also sometimes contain wax, but they are softer than Cerates.
20 Official.

Cataplasma is the same as poultice. Example, *Cataplasma Kaolini*.

Antiseptics are drugs which stop putrefaction. Ex., Phenol, Bichloride.

Disinfectants are drugs which destroy germs. Ex., Formaldehyde.

Anthelmintics are drugs which destroy intestinal worms. Ex., Santonin.

Taeniafuge, also called *Taeniocides*, are drugs which destroy tapeworms.

Diaphoretics are drugs which produce perspiration. Ex., Dover's Powders.

Antiperiodics are drugs which prevent the return of diseases. Ex., Quinine.

Styptics are drugs which stop bleeding. Ex., Tr. Ferri Chlor.

Sialogegues are drugs which produce saliva. Ex., Pilocarpus, Mustard, and Ginger.

Refrigerants are drugs which are cooling and relieve thirst. Ex., Veg. Acids.

Myotics are drugs which contract the pupil of the eye. Ex., Physostigmine.

Mydriatics are agents which dilate the pupil of the eye. Ex., Atropine.

Cardiac Stimulants are drugs which increase the action of the heart. Ex., Adrenalin, Alcohol, Atropine.

Cardiac Depressants are drugs which decrease the action of the heart. Ex., Chloral.

Distillation is the vaporation and condensation of a liquid.

Chemistry is that branch of science which treats of the changes within the Molecule.

Chemistry is divided into two Classes: Organic and Inorganic.

Organic Chemistry treats of the Carbon Compounds or Organic substances or usually those from the vegetable and animal kingdoms.

Inorganic Chemistry treats of the metals and their compounds or those not containing carbon. It is divided into two groups:

The Metals and their compounds, ex., Zinc, Iron, and Lead; and the Non-Metals, such as Hydrogen, Oxygen, Iodine, and Phosphorous.

Molecule is the smallest particle of matter that can exist in a free state.

Atom is a particle so small that it can undergo no further subdivision in chemical transformation.

Physics is that branch of science that treats of the changes that take place on the outside of the molecule, or the change which matter undergoes without losing its chemical identity.

LECTURE No. 4

Pharmacology is the study of crude drugs.

Fractional Distillation is distilling liquids having different boiling points. Example, Making Guaiacol.

Destructive Distillation is heating dry organic matter in a still until all volatile products are driven off. Ex., Acetic Acid, Wood Alcohol.

Emetics are drugs which produce vomiting. Ex., Apomorphine.

Detergents are drugs which are cleansing to wounds.

Hepatics are drugs which act on the liver. Ex., Dil Nitre Hydrochloric Acid.

Somnifacients are drugs which produce sleep. Ex., Trional.

Sudorifics are drugs which produce sweat. Ex., Pilocarpus.

Galactophyga are agents which diminish the secretion of milk. Ex., Belladonna.

Hemostatics are drugs which stop hemorrhages. Ex., Calcium Lactate.

Irritants are drugs when applied to the skin cause vascular excitement. Ex., Mustard Plaster.

Vesicants are drugs which cause blisters. Ex., Cantharides.

Rubefacients are drugs which cause redness of the skin. Ex., Oil Turpentine.

Epispastics are drugs which cause blisters. Ex., Iodine.

Purgatives are drugs which cause the bowels to move.

Laxatives are drugs which gently increase the action of the bowels.

Hydrogogue Cathartics are drugs which produce watery stools. Ex., *Elatarium*.

Cholagogue Cathartics are drugs that increase the action of bile. Ex., *Podophy*.

Aphrodisiacs are drugs which increase sexual desire. Ex., *Strychnine*, *Phosp*.

Anaphrodisiacs are drugs which lessen sexual desire. Ex., *Bromides*, *Camphor* last.

Emmenagogues are drugs which restore the menstrual flow. Ex., *Ergot Savin*.

Ecbolics and Oxytocics are drugs which hasten childbirth or abortion.

Parturients are drugs used in labor cases.

Maceration is the process of soaking a drug in a solvent until the soluble portions are dissolved or softened.

Percolation is the process of placing a drug in a suitable vessel called a percolator, and is deprived of its soluble and active constituents by the downward flow of a solvent through it.

Solvents called *Menstrums* are liquids capable of dissolving or holding another substance in solution. The most important ones are *Water Alcohol*, *Glycerin*, *Dilute Alcohol*, and *Ether*, in the order named.

Trituation is the process of reducing substances to fine particles by the aid of *Mortar and Pestle*.

Sublimation is the distillation of volatile solids.

Pharmacology is the study of crude drugs.

LECTURE No. 5

The Pharmacopoeia is a book containing a list of medical substances with descriptions, tests and formulas for preparing, selected by authority. It is revised every ten years by a committee composed of *M. D.'s* and *Ph. G.'s*. It is published in English with the exception of the names of drugs and Latin is used for

that, as it is the Language of Science and never changes. It is also published in the Spanish language to be used in Cuba and the Philippines.

All Potent Tinctures are ten per cent strength. The word *Official* is the same as U. S. P. lx, and means that it is in the U. S. P.

Protocol International, written P. I., has reference to certain drugs and medicines which was standardized at the international conference which was held at Brussels in 1902 for the unification of potent remedies. In 1916 sixteen governments met and signed these agreements, the United States being the first to adopt some of them.

The term "*Purity Rubric*" in the U. S. P. is a term used to limit the amount of impurities in chemicals by testing the amount of fuse substance which must be present.

A Dispensatory is a book which comments on the U. S. P. The U. S. and the National are the most popular ones.

Posology is the science of doses; the U. S. P. furnishes the average or usual dose.

Metrology is the science of measure and the relation which measure bears to weight. The Metric System is the only system recognized by the U. S. P., yet they furnish the dose in the Apothecary and Metric.

For Prescription writing the old-fashioned Apothecary System is still in use, but is not official. The table follows:

Twenty grains make one scruple, three scruples make one drachm, eight drachms make one ounce, and twelve ounces make one pound.

You will see there are 5,760 grains in one pound in this system. Now the goods sold by the manufacturers and wholesalers are sold by Avoirdupois weight, and the table follows:

437.5 grains in one ounce, 16 ounces in one pound, or 7,000 grains. One fluid ounce of water weighs 454.6 grains at a temperature of 25 degrees centigrade. One gallon of water weighs 8.33 pounds at 25 degrees c.

The *Apothecaries' Fluid Measure* or U. S. Wine Measure is as follows: Sixty minims equal one fluid drachm, eight fluid drachms equal one fluid ounce, sixteen fluid ounces equal one pint, and eight pints equal one gallon. In writing directions, the M. D. uses the following: One fluid drachm equals one teaspoonful, two fluid drachms equal one dessertspoonful, four fluid drachms equal one tablespoonful, and four fluid ounces one gill or teacupful, and eight fluid ounces one tumblerful.

O is the abbreviation for the Latin *Octarius*, meaning Pint.

Cong. is the abbreviation for the Latin *Congius*, meaning Gallon.

Gtt. is the abbreviation for the Latin *Gutta*, meaning Drop.

In the Metric System the *Meter* is the unit of length and is 39.70 in.

The *Liter* is the unit of capacity and is 33.8147 ounces or 1,000 mils or about two pints.

Gramme is the unit of weight and is equal to 15.432 grains.

Remember what you weigh is what you call Grammes and what you pour, or the liquids, is called mills.

Thirty mils. is equal to one ounce.

.065 read 65 millegrammes, abbreviated Gm., is equal to one grain.

The *secondary units* which indicate smaller are in Latin and abbreviated in small letters. They are as follows: Milli equals $1/1000$, Centi equals $1/100$, and Deci equals $1/10$, and the secondary units which indicate large are in Greek and abbreviated in Capital letters: Dekka is ten, Hecto is hundred, and Kilo is thousand, and Myria is ten thousand. The latter are not in use in the U. S. P.

King's Dispensatory is a private work used by the Eclectic School of Medicine.

Galenical Preparations are those where no chemical change takes place in their manufacture.

Aquas, or waters, are aqueous preparations of volatile substances.

Liquors, or solutions, are aqueous preparations of non-volatile substances.

Syrups are concentrated solutions of sugar and water containing medical substances.

Mixtures are aqueous preparations intended for internal use, containing insoluble suspended substances.

Glycerites are mixtures of medical substances in Glycerin.

Spirits are alcoholic solutions of volatile substances.

Tinctures are alcoholic solutions of non volatile substances.

Infusions are liquid preparations made by treating the drug with either hot or cold water.

Extracts are solid or semi-solid preparations made by evaporating solutions of medical substances.

Fluid Extracts are liquid alcoholic preparations made by percolating the drug with a menstrum, concentrating the portion of the percolate so that in each case one mil of the fluid extract will represent the gramme of the drug. They are of uniform and definite strength.

LECTURE No. 6

Materia Medica is that branch of science which treats of the remedies used in the treatment of disease.

Animal Drugs are divided into three classes. The first is the Mammalia, which is the highest class and include those which suckle their young.

The Pisces, or fish class, is second and drugs from this class include cod liver oil, etc., and the third class is the *Insecta*, or insect class, such as Spanish flies and cockroach.

Coccus is Cochineal, called red scale insect. It is the dried female insect of *Coccus Cacti*, inclosing their young larvae.

These insects are gathered by brushing from the trees and killing with heat. They are found in Mexico and cultivated on a large scale. They have no medical value but owe their virtue to the carminic acid which is a coloring agent and present from six to ten per cent; carmine is made from it. Cochineal enters into Tr. Cardamon Co.

Blatta is Cockroach, not U. S. P. Was used as a diuretic in five-grain dose.

Hiruda is Leach. The best variety comes from Europe. They are kept in vessels containing charcoal. They have three jaws and two rows of fine, sharp teeth. One is capable of extracting from one to three teaspoonfuls of blood.

Spongia is Sponge. What we see is only the framework of the animal. It is used in surgery for mopping blood.

Spongia Decolorate is in the N. F. Made by bleaching the sponge with Permanganate, Potash, Sodium, Disulphonate, Hydrochloric Acid, and Bicarb. Soda.

Ossepia is Cuttlefish Bone.

Cantharis is Cantharides, called Spanish Flies, Russian Flies, and Blister Beetle. It is the dried beetle *Cantharis Vesicatoria*, thoroughly dried, yielding not less than .6 or more Cantharidin. They are bronze green in color and about one inch in length. They live in Spain, Russia and Southern Europe. They are collected by shaking off the trees and killing with hot water. They are preserved by the addition of a few drops of Chloroform from time to time to prevent insects. They should not have a strong Ammonia odor; if so, do not use. The active constituent is *Cantharidin*. The dose is one-half grain. They are used internally and externally and said to have aphrodisiac qualities but at the last. They produce blisters when applied to the skin. The Official preparations are: Tinct. Cerate, and Collodion.

Cantharidin is a white substance in the form of white crystalline scales. It is odorless and tasteless, almost insoluble in water or cold alcohol. The British recognize Cantharidin from any beetle, *Malabris Checori*, but the U. S. P. does not.

Suprarenalum Siccum is Dried Suprarenal. It is the suprarenal gland of animals which are used for food by man. It is cleaned, freed from fat, dried and powdered. It contains not less than .6% Epinephrine, which is the active constituent. One part of the dried gland represents six parts of the fresh gland. Dose is four grains. Epinephrine is about the same as adrenalin.

Adrenalin is nearly white to a brown powder, slightly soluble

in water, almost insoluble in alcohol. It is the most powerful hemostatic known and is generally used in the form of a solution made from the chloride in 1/1000 solution. It is used in the sudden failure of circulation and cannot be surpassed. Dose of the solution is 5 to 10 minims.

Thyroideum Siccum, Dried Thyroids. It is dried Thyroin of the animals which are used for food by man. These glands are situated in the neck of the animal and are prepared by removing the fat and connective tissue, treating with petroleum benzine, powdering and drying. The active constituent is 17/100% Iodine in thyroid combination. It is used in wasting disease, which is a tropical disorder. The dose is one and one-half grains. One part of the dried gland represents five parts of the fresh gland.

Hypophysis Sicca, Dessicated Hypophysis. Dried Pituitary Body. It is the posterior lobe obtained from the pituitary body of cattle, cleaned, dried and powdered. The posterior lobe is situated at the base of the brain. It is a small two-lobed body and the smaller is the one used. The anterior, which is the larger, is not used in medicine, and is the one which is essential to life. The smaller lobe contains an active principle called Pituitrin, which has marked effects on blood vessels. Hypophysis Sicca is a yellow or greyish amorphous powder, having a peculiar odor. The dose is one-half grain. It is partially soluble in water.

Liquor Hypophysis is Solution Hypophysis called Solution Pituitary Body. It is a solution containing the water soluble principles of the fresh posterior lobe of the pituitary body of cattle. It is made by extracting the finely minced material with slightly acidulated water, boiled for ten minutes and filter, sterilize this filtrate and preserve in a sterile condition. It is prepared from the dried as it has more definite strength. The dose is fifteen minims. It is a transparent liquid, colorless or nearly so, having a characteristic odor. The U. S. Hygienic Laboratory states that one mil. of solution diluted 20,000 times has the same activity on the isolated uterus of the virgin guinea-pig as a 1-to-20,000,000 solution beta-aminazoly-ethylamine hydrochloride.

Idiosyncrasy is the peculiarity of individual temperament. It is

the term used to note the effects of drugs on different people. That is, some people break out when taking quinine.

Soporifics are drugs which produce sleep. The Bromides, as examples.

Escharotics are the same as caustics; they destroy tissue.

Demulcents are drugs which are soothing. Ex., Flaxseed.

Analgesics are drugs which relieve pain.

Anhidrotics are drugs which check perspiration. Ex., Belladonna.

Carminatives are drugs which aid in the expulsion of gases from the stomach. Asafœtida.

Antizymotics are drugs that stop fermentation.

Errhins, also called *Sternutatories*, are drugs which produce sneezing.

Vulnerary Drugs are those which are healing to wounds.

Mel is honey. It is a saccharine secretion deposited in the honeycomb by the bee (*Apis Mellifera*).

Mel Depuratum is clarified honey, made by heating honey, previously mixing with 2% paper pulp on a water bath, removing the scum as it arises and making up the loss by the addition of water and adding 5% glycerin. It enters into *Mercury with Chalk*, *Honey of Rose*, and *Mass of Carbonate of Iron*.

Cera Flava is yellow wax. It is a solid product obtained from the honeycomb of the bee by melting and purifying.

Cere Alba is white wax. It is made by bleaching yellow wax with Chlorine.

Cetacium is Spermaceti. It is a hard, fatty substance obtained from the head of Sperm Whale (*Physeter Macerocephalous*). It enters into cerates and ointments as a base.

Ambergris is a substance obtained from the intestines of the Sperm Whale. It is not U. S. P., but is used in the MFG of Perfumes.

Os is bone used in making Animal Charcoal.

Sanguis is blood of the ox used in ten-grain doses.

Oleum Bubulum is Neat's-foot Oil or Cow-foot Oil. It is a fixed oil obtained from cow's foot. Used externally.

Oleum Morrhuar is Cod Liver Oil. It is a fixed oil obtained from the fresh livers of the codfish (*Gadus Morrhuæ*). It is a pale yellowish liquid with a fishy odor and taste. It consists chiefly of Olein and an extract called Gaduol and a crystalline substance called Asselline, also a small amount of Phosphorous, Iodine, and Bromine. The dose is three teaspoonfuls. It enters into emulsion of Cod Liver Oil.

LECTURE No. 7

Ovum Gallinaceum is Fresh Egg. It is the recently laid egg of the hen (*Gallus Domesticus*).

Ovi Albumen Recens is the Albumen of the fresh egg. It is the white of the egg used as antidote for mercury poisoning.

Ovi Vitellum is the fresh egg yolk. It is used in making emulsions.

Adeps Ianae is wool fat. It is called Anhydrous Ianolin. It is the purified fat of the wool of the sheep (*Ovis Aries*) freed from water. It is miscible but not soluble in water. It should be preserved in well-closed containers.

Adeps Ianae Hydrosus is Hydrosus wool fat, called Ianolin. It is the purified fat of the wool of the sheep mixed with not more than 30% of water. It is made by mixing anhydrous wool fat with water. It will mix with twice its weight of water without losing its ointment-like character.

Gelatinum is Gelatin. It is the purified product obtained from animal tissue, such as skin ligaments and bone, by treating with hot water. It is used in making capsules and one U. S. P. Preparation.

Gelatinum Glycerinatum is Glycerinated Gelatin. Contains Glycerin Gelatin and water used for pill masses.

Fel Bovis is Ox Gall. It is the fresh bile of the ox (*Bostaurus*). It is a brownish green liquid with a very bitter taste and contains a principle called Glycolic Acid, Sodium Salts, and bile pigments. The powdered extract is official to replace Purified Ox Gall of U. S. P. 8.

Adeps is lard. It is the purified fat of the abdomen of the hog (*Sus Scrofa*). It enters into ointments and cerates.

Adeps Benzoinatus is Benzoinated Lard. Made by melting lard and powdered Benzoin together and straining. The U. S. P. allows a small amount of wax to replace the lard in warm climates.

Serum Praeparatum is Prepared Suet. It is the internal fat of the stomach of the sheep, purified by melting and straining.

Moschus is Musk called Tonquin Musk. It is the dried secretions of the pretutial follicles of *Moschus Moschiferous*. It must be preserved in glass-stoppered bottles. It is usually seen in irregular granules with a penetrating odor, used in typhoid fever in four-grain doses. The Tincture is official and is an example of Tr. of animal origin.

Saccharum Lactis is Sugar of Milk, called Lactose. It is a white powder used in Pharmacy as a dilucent. It is made from whey of cow's milk and sometimes passed through animal charcoal to decolorize it.

Acidum Lacticum is Lactic Acid. It is an organic acid prepared from sour milk. It is 85% strength. Used in making Calcium Lactophosphate. Dose, 4 mils.

Lac Vaccinum is cow's milk and must contain $3\frac{1}{2}\%$ butter fat.

LECTURE No. 8

Enzymes belong to a class of ferments having no definite structure and are not living. We have three official Enzymes: Pepsin and Pancreatin of the animal kingdom and Diastase of the vegetable.

Proteolytic means the power of digestion, or the decomposition of Proteids.

Proteids are a group of substances constituting the greater part of animal or vegetable tissue capable of being changed by the action of acids or enzymes.

Pepsinum is Pepsin. It is a mixture of Proteolytic ferments, or enzymes, obtained from the glandular layer of the stomach of the hog. It should be capable of digesting 3m times its own weight of freshly coagulated and disintegrated egg albumen. It is made by chopping up the mucus lining of the stomach of the

hog, macerating in water containing a small amount of HCl for several days. Strain and allow to stand for 24 hours and decant. Then add Sodium Chloride and the Pepsin will float on top. Then remove to a cloth and dry. The new form of Pepsin known as the spongy variety is made by drying in vacuo. Scale Pepsin is made in the same manner except it is macerated in water long enough to predigest. Pepsin is seen in white, pale yellow, yellowish translucent scales, grains or spongy masses or cream colored powder, free from offensive odor, having an acid or saline taste. In solution it is incompatible with Bismuth, Subcarbonate or Subnitrate and Alkalies. It has no U. S. P. preparations. It does not act on carbohydrates or fats but best given to old people for gastric digestion. It acts better in an acid media or warm place. Dose is 5 to 30 grains.

Pancreatinum is pancreatin. It contains enzymes, consisting principally of Amylopsin, Trypsin, Steapsin. It is found in the pancreas of warm-blooded animals, such as the hog or ox. It converts not less than 25 times its own weight of starch into soluble carbohydrates. It may be brought to a higher digestive degree by mixing with sugar milk. Pepsin can, too. It is seen in yellowish or yellow white powder having a peculiar odor and a meaty taste. It acts on fats and almost any class of foods.

Pancreas are the abdominal salivary glands of animals used for food.

Amylopsin is a diastatic enzyme which resembles Ptyalin, which is the diastatic enzyme of saliva. It converts starch into sugar.

Trypsin is the protein splitting ferment and differs from pepsin in that it acts better in slightly alkaline solutions.

Steapsin is the enzyme which emulsifies fats in the process of digestion and converts them into fatty acids and glycerin.

Rennium is N. F. It is the milk-curdling enzyme of the stomach of the calf. We see Rennit or Junket tablets.

Diastasum is Diastase. It is a mixture containing amylolytic enzymes obtained from an infusion of malt. It converts not less than fifty times its own weight of potato starch into sugars. It is made by adding alcohol to an infusion of malt at no less than

60 degrees centigrade. The dose is one to eight grains given during or after meals.

Ptomaines, called Cadaveric Alkaloids. They are produced when animal substances are subjected to putrification or fermentation. Most of them are intensely poisonous. They have an alkaline reaction and like other Alkaloids unite with acids to form salts.

Filtration is separating a liquid from a solid so as to obtain the liquid in a transparent condition. This is usually done by the use of filter paper.

Colation is the process of straining.

Lotion, called Displacement Washing, is separating soluble matter from a solid by pouring a liquid upon it which will dissolve out the soluble portions.

Clarification is the process of separating solid substances from a liquid without the use of filters or strainers. This is usually done by the aid of heat, paper pulp, gelatin, and fermentation.

The term *Decantion* is separating a liquid from a solid by pouring off the liquid.

Decoloration is depriving a substance of its color by passing it through animal charcoal. Never pass through a solution containing Tannin, Aloin, Alkaloids, as it will absorb them.

Precipitation is separating a solid substance from a solution by the action of heat, light or chemical change. The precipitant is the substance which produces precipitation. That which is produced is the precipitate.

Magma is a heavy, thick precipitate. Two official, Milk Magnesia and Milk of Bismuth.

Sediment is a substance thrown out of solution by the action of its own gravity.

Expression is forcibly separating a liquid from a solid.

Pulverization by Intervention is powdering a drug by the aid of a foreign substance. Ex., Powdering Camphor with Alcohol.

Granulation is heating a chemical substance with constant stirring until a coarse grain powder is produced.

LECTURE No. 9

Botany treats of the structure of plants, the functions of their parts, their classification and the terms used in their description.

Radex is the Latin name for root. It is that part of the plants' axis which do not bear leaves and serve the double purpose of holding them in the ground and absorbing food for them.

The Stem is that part of the plant that bears the leaves. Its functions are to bear the leaves and the floral organs.

Annual Stem is one which lives but one season.

Biennial Stem is one of two years' duration.

Perennial Stem is one that lives from year to year.

Underground Stems are called Subterranean Stems, and are rhizomes, tubers, and corms.

Rhizomes are underground stems marked with scales. Ex., *Podophyllum*.

Tubers are short, thick underground stems. Ex., *Aconite*.

Corm is a very thick underground stem. Ex., *Colchicum*.

The organs of reproduction of plants are the flowers, fruits, and seeds.

Plant Hairs are called *Trichomes*.

Plant Cells are defined as a Mass of Protoplasm.

Protoplasm is a semi fluid substance that exists in plant cells and contains C. H. N. S. & O.

Parasite Drugs are those that live at the expense of other drugs. Nut Galls.

Saprophite Drugs are those which get their substance from decayed organic matter.

Autosite Drugs are those capable of supplying food for itself and the parasite.

Flowers when complete have four sets of leaves—The Calyx, Carroлла, Stamen, and Pistle.

The Calyx is the outer leaflet of the flower.

The Stamen is the male organ of the plant.

The Pistle is the female organ of plants.

Fertilization is the union of two reproductive cells, the pollen cell and the gum cell.

A *Spore* is a reproductive body of a Cryptogram, which is itself a flowerless plant.

Granular Effervescent Salts are made by mixing the medicine in the form of a dry powder with citric acid and bicarbonate of soda, passing through a sieve and drying the granules.

Pulvis Effervescens Compositus is Seidlitz Powder. The white powder contains 35 grains Tartaric Acid and the blue powder contains 40 grains Bicarbonate of Soda and 120 grains Rochelle Salts. The dose is one set of two powders.

Solution is when a substance is made to disappear when brought in contact with a liquid called a solvent. Solubility is aided by heat, pulverization and agitation.

An *Insoluble Substance* is one which will not dissolve when acted upon by a solvent.

A *Saturated Solution* is one that will take up no more of the soluble substance.

A *Supersaturated Solution* is one made to hold in solution under certain conditions more than in ordinary circumstances.

A *Circulatory Solution* is one made by placing the drug in a gauze bag and suspending in the solvent.

*Some of the most important solvents used in Pharmacy—*Water, Alcohol, Dilute Alcohol, Glycerin, Ether, Acetone, and Carbon Bisulphide.

Exsiccation is the process of depriving a substance of its water or crystallization by the aid of high heat.

Levigation is the process of reducing a substance to a state of minute division by triturating after it has been made into a paste with water or other liquids.

Elutration is the process of obtaining a substance in fine particles by suspending an insoluble powder in water, allowing the heavy particles to subside, decanting the liquid and collecting the fine particles.

Trochiscation is the process of making the pasty mass obtained by Eleutration into cones.

Aquae means Waters. Waters are aqueous preparations of volatile substances. We have nineteen official waters, including common water.

The Medicated Waters are made in four ways: First, by agitating the medical substances with water; second, by passing gas through water, ex., ammonia water; third, by filtering through an absorbent powder, ex., aromatic waters; and, fourth, by distillation, ex., aqua hamamelidies (Witch Hazel).

We have two official waters where alcohol is used in their preparation. They are Camphor Water and Witch Hazel.

We have two that are classified as byproducts. They are Stronger Rose Water and Stronger Orange Flower Water.

The U. S. P. now provides a general formula for the Aromatic Waters: Oil 2. and Talc 15. Aqua Dist, recently boiled, qs to 1000 mls. Note: The water must be recently boiled.

Aromatic Waters should be as far as possible saturated solutions, free from solid impurities and made in small amounts to prevent the development of microscopic plants.

Purified Talc is used in making all medicated waters on account of its insolubility.

Aqua is water. It is a colorless limpid liquid, practically tasteless, odorless, and when heated to boiling and agitated no disagreeable odor should be noticed. It will not change the color of litmus paper. In every one hundred mls there should not be more than .03 of residue after the water has been evaporated to dryness. When this residue is heated to redness no fumes or charring should be noticed. On account of its impurities it has been replaced by distilled water in the manufacture of all U. S. P. Preparations. The molecular weight is 18. The specific gravity is 1. at 25 degrees centigrade.

Aqua Distillata is Distilled Water, made by using 1,000 volumes, distill and reject the first 100 volumes and retain the next 750 volumes and reject the last 150 volumes. The reason for this is that the first 100 volumes contain carbon dioxide and the last 150 contain organic matter.

Aqua Distillata Sterilisata is Sterilized Distilled Water. It is

made by placing distilled water in a hard glass flask, covering the mouth of the bottle with a pledget of cotton and boil for thirty minutes. Allow the water to cool without removing the cotton and protect the cotton by covering with paper. It should not be used after it has been made for 48 hours.

The following are the official Aromatic Waters: Aqua Anisi (Anise Water), Aqua Cinnamomi (Cinnamon Water), Aqua Fenniculi (Fennel Water), Aqua Minthea Piperitae (Peppermint Water), Aqua Mintha Viridis (Spearmint Water).

Aseptic means free from germs.

Pharmacodynamice is the study of the action of drugs on living organisms.

LECTURE No. 10

Fusion is liquifying solid bodies by the aid of heat.

A *Crucible* is a cup-shaped vessel intended to withstand great heat. They are usually made from clay or porcelain.

Ebullition is the same as boiling.

Vaporization is the process of increasing molecular motion until the substance assumes the form of vapor or gas.

Spontaneous Evaporation is evaporating liquids at ordinary temperature.

Evaporation in vacuo is evaporating liquids without access to air. When you desire to evaporate a liquid to a fixed weight, use a tarred vessel.

Heat is molecular motion. It is measured by the thermometer. There are three kinds of thermometers, but the U. S. P. only uses the Centigrade. The Celsius Scale, as it is called, is used because it is easier to calculate; the freezing point is 0 (zero) and the boiling point 100. The Fahrenheit freezing point is 32 and the boiling point 212. The English use the Reaumur, the freezing point is 0 (zero) and the boiling point is 80.

The rule to convert Centigrade into Fahrenheit is: multiply the centigrade degrees by 1.8 and add 32. Example: Convert 15 C. into F.; 1.8 multiplied by 15 equals 27, and 27 plus 32 equals 59.

To convert F. into C., subtract 32 and divide by 1.8. Example: 59 F. into C. 59 minus 32 equals 27, and 27 divided by 1.8 equals 15.

Convert 16 degrees F. into C.: 16-32 equals minus 16, or 16 below, so 16 divided by 1.8 equals 8.8, because the difference between 1 degree C. and 1 degree F. is .8.

The Clinical Thermometer is used for taking the temperature of the human body. Normal temperature is 98.5 degrees F.

Physic is the art of medicine, or a medicine or drug especially cathartic.

Aqua Chloroformi—Chloroform Water. It is a saturated solution of Chloroform and distilled water and is made by agitating. It contains about $\frac{1}{2}\%$ CHCl_3 . It should be kept from light to prevent the formation of HCl . An excess of Chloroform is directed to always be present in the container. It is used to disguise the taste of saline salts and as a sedative in $\frac{1}{2}$ -oz. doses.

Aqua Creosoti is Creosote Water. It contains ten (10 mils. of creosote to 990 mils. of distilled water. It is made by agitation and filtering; must be prepared fresh. Used in nausea and tuberculosis. Dose, $2\frac{1}{2}$ drachms.

Aqua Lauroceresi is Cherry Laurel Water, not U. S. P. Contains .1% HCN .

Aqua Anethii is Dill Water. Not official.

Anethii Fructus is Dill Fruit. It is the fruit of *Anethum Gravelloens*. It belongs to the N. O. Umbellifera. Not U. S. P.

Aqua Ammonia is Ammonia Water. It is a stimulant and caustic. The dose is 1. It is 10% strength and should be kept in glass-stoppered bottles. We have Ammonia Liniment and Aromatic Spts. Ammonia made from it.

Aqua Ammonia Fortioris is stronger Ammonia Water. It should be not less than 27 nor more than 29% St. It should be kept in partially filled glass-stoppered bottles.

Aqua Hamamelidis is Hamamelis Water, called Witch Hazel Water, or Witch Hazel, or Extract Witch Hazel. It is made by macerating the bark, twigs, or entire Witch Hazel Shrub in water and distilling and then adding 15% Alcohol.

A Test: If a little Witch Hazel Water is added to 8 drops of

a 1-to-200 solution of resorcin and a little sulphuric acid is added no red ring or white layer should appear, showing the absence of formaldehyde.

Aqua Cinnamomi is Cinnamon Water, made like other aromatic waters. It will gradually become cloudy and a precipitate will collect on the side of the bottle. This is due to the Cinnamic Aldehyde, which is in the oil, gradually changing into Cinnamic Acid.

Aqua Amygdalae Amara is Bitter Almond Water. It contains one mil. of Oil of Bitter Almond in 999 mls. of distilled water, made by agitation. The U. S. P. states that it should contain a mere trace of Hydrocyanic Acid and differs from the P. I., as that contains .1%. The dose of the U. S. P. is 1 drachm.

LECTURE No. 11

Specific Gravity is the weight of one body compared with the weight of an equal bulk of another body, which is selected as a standard, and both bodies having the same temperature. The temperature selected by the U. S. P. is 25 degrees C., except Alcohol, which is 15.6 degrees. The temperature used in Europe is 4, the maximum density of water. The Specific Gravity of water is 1.000. The advantages of Specific Gravity is to enable us to identify substances and judge as to their purity.

To obtain the Sp. G. of a liquid, place a tarred vessel of specified capacity on your scales and weigh it filled with water, then subtract the weight of the vessel from the combined weight and this gives you the weight of the water; then treat the substance the Sp. G. of which is desired in the same manner, and divide the weight of the substance by the weight of the water and your answer will be the Sp. G. of the substance. Example: A bottle weighs 410 grains, when filled with water it weighs 740 grains; so 740 minus 410 equals 330, the weight of the water. The same bottle filled with glycerin weighs 821 grains; 821 minus the weight of the bottle, 410, equals 411; so 411 divided by 330 equals 1.2455, the Sp. G. of the glycerin.

The Pyonometer is a Specific Gravity Bottle, and is most accurate of all methods for taking the Sp. G.

The Hydrometer, often called *Aremeters*, are instruments used for taking the Sp. G. of liquids by sinking to a depth corresponding to the density of the liquid. There are two kinds on the market, one for liquids heavier than water and those lighter.

Urinometer is a floating instrument used to take the S. Pg. of urine.

A *Saccharometer* is one used for taking the Sp. G. of syrups.

A *Lactometer* is one used to take the Sp. G. of milk.

Glucosides. The English name ends in "in" and the Latin in "inum." They usually represent the active principle of plants. They are neutral in reaction. When they are treated with dilute mineral acids or a ferment they split up and one of the products is glucose. Salicin, Strophantin, and Ammoniated Glycyrrhizin are the official Glucosides.

Resinoids, also called *Resins*, are obtained from plants by pouring a concentrated alcoholic solution in water, the resin being precipitated, filtered out and dried. We have four resins official.

Resina, called *Rosin*, is what is left in the still after the volatile oil has been distilled from turpentine. It enters into cerates, some ointments and plasters.

Resin Podophyllum, called *Podophyllin*, is made by percolating the podophyllum root with alcohol and pouring the concentrated solution in water containing a small amount of HCl, collecting the precipitate and drying. The dose is $\frac{1}{4}$ gr. It is sometimes called vegetable calomel. Resin of Scammony and Resin of Jalap are both made in the same way except the HCl is left out of the water.

Matter is anything having weight and occupying space. It exists in three states: Solid, Liquid, and Gaseous.

The Solid, the molecules are compact. The Liquid, the molecules move freely around, and the Gaseous, the molecules are so far apart that they have lost all attraction for each other.

Mass is the smallest particle of matter that can be appreciated by the senses.

Divisibility is the mechanical subdivision of matter into parts, the smallest particle of matter obtained by this subdivision we call Molecules. All changes that take place within the molecules is Chemistry.

Elements are substances which cannot be split up into any simpler form of matter. There are about eighty Elements. Ten are gaseous, ex., H. N. O. & C.; two are liquid, ex., Bromine and Mercury, and the remainder solids.

A *Chemical Compound* is two or more elements combined in definite proportion. Example: Water, H_2O , Hydrogen, Monoxide.

The Law of Definite Proportion is: The relative weight of elementary substances contained in a compound are definite and never vary. Ex., H_2O .

A *Binary Compound* is one whose molecule consists of two elements. Ex., H_2O .

A *Ternary Compound* is one whose molecule contains three elements. Ex., H_2SO_4 .

A *Quaternary Compound* is one whose molecule contains four elements. Ex., $KHSO_4$.

The Properties of a Compound are the properties of its own and entirely different from those of its constituent elements.

Analysis is breaking a substance down from its component parts.

Synthesis is building a substance up from its component parts.

The Principles of Chemical Nomenclature are: That the name shall indicate as far as possible the composition and constitution of the substance. (By composition we mean the kind of elements the molecule is composed of and the number of atoms of each kind and by constitution we mean the relation which the atoms composing the molecule bear to each other. The Graphic Formula shows this.)

Oxidation is adding Oxygen to a substance. *Reduction* is taking Oxygen from a substance.

Oleoresins are mixtures of oils and resins. They are prepared by placing the drug in a special glass percolator for volatile substances, pack the powder firmly and pour on your ether and per-

colate slowly. Recover the greater part of the ether by distillation on a water bath; transfer the residue to a dish and allow the remainder to evaporate in a warm place.

Oleoresins have no definite strength, the dose varying, as example, Capsicum is $\frac{1}{2}$ gr. and Aspidium is 30 gr.

Oleoresin of Petrosilina is Liquid Apiol. Dose, 8 minims.

Oleoresins are all insoluble in water. They should be from a soft solid to a liquid and should be kept in well-stoppered bottles.

Copaiba is known as Balsam Copaiba. It is not a balsam but a natural Oleoresin obtained from several species of Coaiba from S. A. It belongs to the Family Leguminose. It is used as a diuretic, expectorant, stimulant and antiseptic.

Terebinthina is Turpentine. It is a natural Oleoresin from the Southern pine. It is not U. S. P. Upon distillation it yields Volatile Oil of Turpentine and Resina or Rosin.

Density is the quantity of a substance expressed in weight in a given space.

LECTURE No. 12

Liquors are aqueous preparations of non-volatile substances, in a menstrum, consisting chiefly or wholly of water .25' official.

Liquors are divided into two classes: *Chemical and Simple*.

Ex. Chemical Solution is Ammonii Acetatis, and *Ex. Simple*, Liquor Calcis. Remington classes 12 Simple and 13 Chemical.

All Arsenic Solutions are 1% strength and the dose is 3 to 5 minim.

Liquor Acidi Arsenosi is Solution of Arsenous Acid, called Hydrochloric Solution of Arsenic and also Solution of Arsenic Chloride. Made by dissolving Arsenic Trioxide in dilute Hydrochloric Acid and water by the aid of a little heat. Dose, 3 minims.

Liquor Arseni et Hydrargyrid Iodide, Solution of Arsenous and Mercuric Iodide, known as Donovan's Solution. Made by dissolving Iodide of Arsenic and Red Mercuric Iodide in distilled water. It should be a light straw color and if darker it shows free Iodine and should be rejected. It is used as an alterative

and the dose is $1\frac{1}{2}$ minims. To prevent liberation of Iodine, keep a globule of mercury in the bottle.

Liquor Calcis is Solution of Calcium Hydroxide, called Lime Water and Aqua Calcis. Made by slacking lime very gradually by pouring 1m mls. of water on it and let stand half hour, then pour off the liquid and throw away. Take the Magma of Calcium Hydroxide and wash with boiled distilled water. Then return the paste or magma to a suitable vessel and add 5m mls. of distilled water. Let stand 24 hours before using, then as the liquid is wanted use only the clear solution, allowing the magma to remain in the bottom of the bottle. If hard water is used, scales of Carbonate of Lime will form on the top and sides of the bottle. Dose Lime Water, 4 mls. Antacid.

Hard Water contains lime, but can be made soft by boiling.

Liquor Iodi Compositus is Compound Solution of Iodine, known as Lugol's Solution. It contains 5% Iodine and 5% Iodide. Potash and Water. The Iodide of Potash is added to make the Iodine soluble. In every fluid drachm of this solution there are 3.1 grs. of Iodine. It should be kept in glass-stoppered bottles. Dose, 3 minims. Used as alterative.

Liquor Plumbi Subacetatis Dilutus. Diluted Solution of Subacetate Lead, called Lead Water. Made by mixing Solution of Subacetate of Lead with Distilled Water. It becomes opalescence on standing, due to the formation of Carbonate of Lead. This can be cleared up by the addition of a few drops of Acetic Acid. It is used as an astringent and antiseptic Ext.

Liquor Potassii Hydroxidi, Solution of Potassium Hydroxide. It should contain not less than 4.5% Potassium Hydroxide. Made by dissolving KOH in water. Dose, 1 mill.

Liquor Sodii Arsenatis, Solution of Sodium Arsenate, is Solution of Sodium Arsenate 1% strength. Made by dissolving Sodium Arsenate in Distilled Water. Used as alterative and antiperiodic. Dose, 3 minims.

Pearson's Solution of Sodium Arsenate is in the N. F. and is also P. I. It is $1/10$ the strength of the U. S. P. preparation above.

Liquor Sodii Hydroxidi, Solution of Sodium Hydroxide, contains 4.5% Sodium Hydroxide in water. Dose, 1 mil. Antacid.

Liquor Cresolis Compositus is Compound Solution of Cresol. It is very similar to Lysol. It contains Cresol, Linseed Oil, KOH , Alcohol and water. It is antiseptic, deodorant, and disinfectant.

Liquor Hypophysis is Solution of the Pituitary Body. It is a solution of the water soluble principles of the posterior lobe of the Pituitary Body of cattle. It is used as a Hemostatic. Dose, 1 mil.

Liquor Sodii Chloridi Physiologicus is Physiological Salt Solution, known as Normal Salt Solution. Made by dissolving 8.5 Sodium Chloride in freshly distilled water, qs to 1m mls. Then sterilize by boiling for one hour, and preserve in sterile condition. This preparation must be carefully made and not used after 48 hours made.

Liquor Sodii Glyserophosphatis, Solution of Sodium Glycerophosphate, called Solution Sodium Glycerinophosphate. It is 50% strength. It is clear to a yellowish syrupy liquid. Used as a nerve tonic in 6 minim doses.

The above solutions are all Simple Solutions. Chemical Solutions follow.

LECTURE No. 13

Liquor Ammonii Acetatis, Solution of Ammonium Acetate, called Spirits Mindererus. It should contain not less than 7% Ammonium Acetate. Made by dissolving 5 gm. Ammonium Carbonate in 100 mls. dilute Acetic Acid. The Ammonium Carbonate that is used must be in hard translucent pieces and the solution freshly prepared and have a slight acid reaction. It is used as a diaphoretic and diuretic and enters into Basham's Mixture.

Dilute Acetic Acid can be made by mixing one part Acetic Acid and five parts of water.

Liquor Ferri et Ammonii Acetatis, Solution of Iron and Ammonium Acetate, known as Basham's Mixture. Made by adding Solution of Ammonium Acetate to Dilute Acetic Acid, then add Tincture Iron, Glycerin, Simple Elixir and water qs. It should be freshly

prepared. Dose is 4 fluid drachms. Always be sure your mixture of Ammonium Acetate and Dilute Acetic Acid is thoroughly acid before adding your Tr. Iron and other ingredients. The brown precipitate which falls on standing or if prepared improperly is Basic Ferris Acetate. This preparation should be a clear reddish liquid.

Liquor Ferri Chloridi, Solution of Ferric Chloride, called Solution of Chloride of Iron. Contains Iron Wire, Nitric Acid, Hydrochloric Acid and Distilled Water. It is between 10 to 11% St. It is used for making Tr. Chloride of Iron.

Liquor Ferri Subsulphatis, Solution of Subsulphate of Iron, known as Monsell's Solution. Made by adding Sulphuric Acid to water and heat to 100 degrees, then add Nitric Acid. Then take Sulphate of Iron and divide into four parts and add one part at a time, allowing effervescence to cease after each addition. It is a reddish brown liquid containing 13.5% Iron. This solution sometimes crystalizes, forming a whitish mass. The application of a little heat will restore it. It is used as a styptic. Dose, 3 minims.

Liquor Ferri Tersulphatis is Solution of Ferric Sulphate. Made in the same manner as Monsell's Solution except in different proportions. It contains 10% of Iron. It is used for preparing the antidote for Arsenic.

Liquor Hydrogenii Dioxidii is Solution of Hydrogen Dioxide, called Peroxide of Hydrogen. Formula H_2O_2 . It was formerly classed as a water but the substances used in its manufacture were found to be only slightly volatile. It should contain when fresh 3% Hydrogen Dioxide, corresponding to 10% available Oxygen. The U. S. P. allows 4 centigrammes of Acetanilide to every 100 mls. as a preservative and when this is used and the Sol. develops a bitter Almond odor it should be rejected. It should be kept in a cool place protected from light with the stopper covered with paraffine or covered with cotton. It can be made by acting on Barium Dioxide with Phosphoric Acid and water. It is used as a deodorant, antiseptic. Dose, 1 drachm.

Liquor Plumbi Sabacetatis is Solution of Lead Subacetate,

known as Goulard's Extract. It is an aqueous solution, containing Lead Subacetate corresponding to 18% Lead. It contains Lead Acetate, Lead Oxide and water. Made by dissolving Lead Acetate in boiling distilled water, then add this to the Lead Oxide and boil the mixture for half an hour and add previously boiled distilled water qs. It is a clear colorless liquid used for making Lead Water, also used externally. The reason it is boiled and the reason freshly boiled distilled water is used is to expel all air, as it contains CO_2 gas, which would cause a precipitate of Carbonate of Lead.

Liquor Potassii Arsenitis, Solution of Potassium Arsenite, called at the P. I. *Liquor Arsenicalis Fowleri*, known as Fowler's Solution of Arsenic. It is made by boiling Arsenic Trioxide with Potassium Bicarbonate in a little water until solution is formed, then add Tr. Lavender and filter. Lavender is added to color and taste.

Liquor Magnesii Citratis, Solution of Magnesium Citrate. Made by dissolving Citric Acid in hot water and rubbing up Magnesium Carbonate in water and mixing the two solutions, then add syrup and heat to boiling, then add Oil of Lemon previously triturated with purified talc, and then filter and add water qs., and place in a bottle of special make and add Potassium Bicarbonate, and stopper at once. Bicarbonate of Soda is permitted to replace the Potash if desired. The dose is one bottleful, 12 ounces.

LECTURE No. 14

Liquor Sodae Chloranatae, Solution Chlorinated Soda, called Labarraque's Solution. It is used as a disinfectant and deodorant. Made by acting on a solution of Chlorinated Lime with a Solution of Carbonate of Soda. It should contain not less than $2\frac{1}{2}\%$ of available Chlorine. It is a pale greenish liquid.

Eau de Jevelle is Jevelle Water. It is identical with Labarraque's Solution except Potash is used instead of Soda. It is in the N. F.

Dakin's Solution is made by acting on Carbonate of Soda in

water mixed with Chlorinated Lime. Let stand for one hour and syphon off the clear solution and add Boric Acid.

Carral-Dakin's Solution is made by acting on a Solution of Chlorinated Lime with a solution of Carbonate and Bicarbonate of Soda.

Liquor Zinci Chloride, Solution of Zinc Chloride, called Burnett's Solution or disinfecting fluid. Contains Zinc, Hydrochloric Acid, Nitric Acid, Precipitated Carbonate of Zinc, and water. It is used as a disinfectant. It is a clear, colorless liquid and odorless.

Liquor Chlorig Compositus, Comp. Solution of Chlorine, known as Chlorine Water, N. F. It should contain not less than .4% Available Chlorine. It contains Potassium Chlorate, Hydrochloric Acid and water. It is a yellow liquid used as a disinfectant and is used in dilute solutions in Scarlet Fever and Diphtheria.

Liquor Sodii Boratis Compositus, Compound Solution of Sodium Borate of Soda, known as Dobell's Solution. Contains Sodium Borate, Sodium Bicarbonate, Liquified Phenol, Glycerin, and water. Used as an alkaline antiseptic nasal spray. The change that takes place in this mixture: The Borax is decomposed by the Glycerin and converted into Boric Acid and Glyceroborate, and the Boric Acid acts on the Bicarbonate of Soda and liberates CO₂ gas.

Compound Solution of Phosphate of Soda N. F. contains Phosphate of Soda, Citric Acid, Glycerin, and water. Made by heating Citric Acid and Phosphate of Soda in a porcelain vessel on a water bath until liquified. Filter the solution while hot and add the Glycerin and distilled water. The water must be freshly boiled and the solution kept in a moderately warm place. The Glycerin is added to effect solution and the Citric Acid to prevent crystallization. In every mil. of the solution there is one gram of Soda. The dose is 8 mills. When called upon to make a permanent solution of Phosphate of Soda use this method.

All Wines, Whiskies and Brandies have been dropped by the U. S. P. and added to the N. F. There are 16 wines recognized by the N. F. and one is not Medicated Sherry Wine.

Vinum means Wine. *Vinum Rubrum* is Red Wine, and *Vinum Album* is White Wine.

Red Wine is made by fermenting the juice of the grapes in the presence of their seeds and skins. In making *White Wine* the grapes are freed from their seeds and skins. Both *Red* and *White Wine* should contain 8 to 15% of Alcohol. This strength is according to the P. I.

White Wine was used in the manufacture of all the Official Wines and Alcohol was added to Wines as a preservative.

Vinum Xericum is Sherry Wine and is a *White Wine*, 20%.

Vinum Potense is Port Wine. It is a *Red Wine*, 16 to 22.

Wines contain a great deal of *Tannin*. They can be detannated by adding Tr. Chloride of Iron, little at a time until it ceases to turn black, then add six ounces of fresh milk to each gallon and let stand and filter.

Medicated Wines are liquid preparations containing the soluble principles of drugs dissolved in wine.

Wine of Antimony is made by dissolving Tartar Emetic in boiling water and then adding Sherry Wine.

Vinum Colchici Seminis is Wine of Colchicum Seed. Contains fluid extract of Colchicum Seed and Alcohol in Sherry Wine. Dose, 30 minims.

Vinum Ferri Amarum is Bitter Wine of Iron. It is made from Citrate of Iron and Quinine. *Vinum Ferri* is made from Iron and Ammonium Citrate.

Vinum Carnis et Ferri is Wine of Beef and Iron, called Beef Wine and Iron.

Acetae Vinegars are liquid preparations made by treating the drug with dilute Acetic Acid. One official.

Acetum Scillae, Vinegar of Squills. It contains 10% Squills. Made by macerating Squills with dilute Acetic Acid for seven days, then strain and wash the mass with dilute Acetic Acid qs., then heat to boiling, which is done to coagulate albuminous matter so that when it is added to sugar and water in making Syrup of Squills it will be clear.

Vinegar of Opium was official and was 10% St. It was called Black Drop.

LECTURE No. 15

Spirits are Alcoholic solutions of volatile substances, 15 official, 8 in the N. F. Spirits made by maceration are called *Essences*.

Spirits are made in the following ways: First, by Maceration; ex., Peppermint. Second, Simple Solution; ex., Spirits of Camphor. Third, by Gaseous Solution; ex., Spirits Ammonia, not official. Fourth, by Chemical Reaction; ex., Spirits Nitre; and, Fifth, by Distillation; ex., Spirits Frumenti.

Spiritus Aetheris is Spirit of Ether, known as Hoffman's Drops. Made by mixing Ether with Alcohol. It is used as antispasmodic, analgesic, and stimulant. Average dose, 4 mls.

Compound Spirit of Ether is Hoffman's Anodyne, N. F. Contains Ether, Alcohol, and Etheral Oil. Dose is 4 mls.

Compound Spirit of Orange, Latin, *Tittle Spiritus Aurantii Compositus*, contains Oil of Orange, Oil of Lemon, Oil of Anise, Oil of Coriander, and Alcohol. It should be kept in a dark, cool place in well filled, tightly stoppered bottles. It is used for making Simple Elixir.

Spiritus Aetheris Nitrosi is Spirit of Nitrous Ether, called Sweet Spirit of Nitre. It is an alcoholic liquid containing 4% Ethyl Nitrite. It is a diuretic, diaphoretic, antispasmodic. Dose, 2 mls.

Spirit of Ammonia is made by mixing ammonia water with alcohol and distilling.

Spiritus Ammoniae Aromaticus, Aromatic Spirit of Ammonia. It is made by dissolving Ammonium Carbonate in water and a little Ammonia Water; let stand for 12 hours, then dissolve Oils of Lemon, Lavender, and Nutmegs in Alcohol and mix the two solutions. Let stand for 24 hours and filter. The reason Ammonia Water is used is to convert the Ammonium Carbonate into a normal salt and make it more soluble. The reason you let it stand for 24 hours is to allow the white crystalline precipitate to fall. This precipitate is Ammonium Bicarbonate and is insoluble in Alcohol.

Aromatic Spirits of Ammonia when first made is clear, but on

standing it gradually darkens, due to the action of the Ammonia on the Alcohol and Oils, but this does not affect the therapeutic action. Dose is 2 mils (30 minims).

Spiritus Juniperi Compositus, Compound Spirit of Juniper, is known as Holland Gin. Used as a diuretic. Dose, 10 mils.

Spiritus Camphorae, Spirit of Camphor. It is 10% strength, made by dissolving Camphor in Alcohol. Used as anodyne, antispasmodic, and stimulant. Dose, 1 mil.

Spiritus Chloroformi, Spirit of Chloroform. It is 6% strength. Made by mixing Chloroform and Alcohol. Dose, 2 mils (30 minims). Used as anodyne and sedative. Valuable in cough mixtures.

Spiritus Menthae Piperitae, Spirit of Peppermint. Made by macerating the Peppermint Herb in water for one hour, then add the herb to Alcohol and Oil of Peppermint and let stand six hours and filter. The herb is used solely to give the spirit color. It is a fine green color. Used as a carminative, flavoring, and stimulant. Dose, 30 minims.

Spiritus Menthae Viridis is Spirit of Spearmint. Made and used like Spirit of Peppermint.

Spiritus Amygdalae Amarae is Spirit of Bitter Almond. Contains Oil of Bitter Almond, Alcohol and a small quantity of water. The U. S. P. states that it is for medicinal use only and must not be sold for flavoring. The dose is 8 minims.

Spiritus Glycerylis Nitratis, Spirit of Nitroglycerin, called Spirit of Glyceryl Trinitrate, also Spirit Glonoin. It is 1% strength. It should be tasted with great care, as it will produce a great headache. It should be handled with caution, as it is liable to explode and cause fire. If by accident it should be spilled, pour a solution of Potassium Hydroxide on it. The dose is one minim. In every minim there is 1/100 grain of Nitroglycerin. It is used in epilepsy, asthma, and cardiac stimulant.

Spiritus Formicarum N. F., known as Spirit of Ants, is Spirit of Formic Acid.

Mistura Mixtures are aqueous preparations intended for internal use and contain insoluble suspended substances. Two official.

Misturae Cretae, Chalk Mixture, contains compound chalk

powder, cinnamon water and water. Used as an antacid. Dose, 15 mils.

Misturae Glycyrrhiza Compositus, known as Brown Mixture, contains Ext. Licorice, Acacia, Tartar Emetic, Syrup, Paregoric, Sweet Spirits Nitre, and water. Used as a demulcent, expectorant, diuretic, and as a vehicle for Ammonium Chloride in cough mixtures.

All mixtures are liable to ferment and should be freshly prepared and dispensed with a shake label.

Mixture Rhubarb Compound, known as Mixture Rhubarb and Soda, also Neutralizing N. F. Cordial.

Acid Camphor Mixture is Hope's Mixture, N. F.

Copaiba Mixture is Lafayette's Mixture, N. F.

Compound Iron Mixture is Griffith's Mixture, N. F.

Mixture of Opium and Chloroform is Squibb's Diarrhœa Mixture, N. F.

Mixture of Opium and Sassafras is Godfrey's Cordial.

Compound Spirits of Myrcia is Bay Rum, N. F.

Spiritus Ammoniae Anisatus is Anisated Solution of Ammonia. Contains Anathol, Ammonia Water, and Alcohol. N. F.

LECTURE No. 16

Percolation is the process whereby a powder is placed in a suitable vessel called a percolator and is deprived of its active and soluble constituents by the descent of a solvent through it.

The Term Lexiviation, or Displacement in Pharmacy, is the same as percolation. The rate of flow in percolation can be controlled by the use of a piece of rubber tubing placed on the neck of the percolator and the use of a stop-cock.

The Object of Moistening the drug before percolation begins is to allow the drug to swell and receive the menstrum.

The reason the drug is passed through a sieve is to get the drug more uniform after swelling.

The Cylindrical Percolator is best for Pharmaceutical use. Drugs that are liable to swell, a cone-shaped percolator is best.

Volatile Substances, the percolator should be covered. Hot percolation should be carried on in metal percolators.

The Advantage Percolation has over Maceration is, in maceration there is always some finished product left in the vessel.

Fractional Percolation is known as repercolation, that is, using the same menstrum to fresh portions of the drug.

The Marc is what is left in the percolator after percolation.

Linimenta, Liniments, are solutions or mixtures of various medicinal substances with oleogenous fluids, Alcohol or Liquid Soap, intended for external use. Eight official.

Four Liniments are made with Alcohol as a vehicle, three with a fixed oil, and one with Oil of Turpentine as a base.

Ammonia Liniment is made by mixing Sesame Oil and Ammonia Water.

Linimentum Saponis, Soap Liniment, contains dried Castile Soap, Camphor, Oil Rosemary, Alcohol and water. It is 4.5% Camphor. This liniment should stand 24 hours before filtering, as a precipitate generally falls which is Sodium Palmetate, and should be filtered out. If you use a soap made from animal fats, the liquid will gelatinize. Called Liquid Opodeldoc.

Linimentum Saponis Mollis is Liniment of Soft Soap. Contains soft soap, Oil of Lavender and Alcohol. It is called Tincture of Green Soap.

Linimentum Terebinthinae, Turpentine Liniment, known as Kintish Liniment, is made by dissolving Rosin Cerate in Oil of Turpentine. It is so thick that it is dispensed in Ointment jars.

Linimentum Chloroformi is Chloroform Liniment, made by mixing 70% Soap Liniment and 30% Chloroform.

Linimentum Calcis is Lime Liniment, known as Carron Oil. Made by mixing equal parts Lime Water and Linseed Oil (raw oil). This liniment is very valuable for burns and it is an example of a soluble soap.

Linimentum Camphora is Camphor Liniment, known as Camphorated Oil. Made by dissolving Camphor in Cottonseed Oil by the aid of heat on a water bath. Contains 20% camphor.

Belladonna Liniment contains Camphor and Belladonna Root Fluid Extract.

Camphorated Soap Liniment, N. F., is Solid Opodeldoc.

Acetic Turpentine Liniment, N. F., is known as Stokes' Liniment and St. John Long's Liniment, and contains egg as the suspending agent.

Oleates are a class of preparations intended for external use, composed of metallic salts or alkaloids in Oleic Acid, which is readily absorbed by the skin.

Oleate of Mercury is made by mixing yellow Oxide of Mercury, Alcohol, and add Oleic Acid. Apply little heat until alcohol is expelled, then add Oleic Acid qs. It is 25%, and the only official Oleate.

Oleates are made direct from the Alkaloids and not their salts, and Oleate of Atropine and Oleate of Veratrine are 2% strength. Oleate of Cocaine should be 5% strength, and Oleate of Quinine 25%. Oleates are more readily absorbed by the skin than any other substances.

Petroxolinums are a class of external preparations readily absorbed by the skin and resemble the Petrogen Preparations on the market. Their value depends on their ingredients being soluble in the base.

Liquid Petroxolin contains Light Liquid Petrolatum, Oleic Acid, Oil of Lavender, Ammoia Water and Alcohol. It is a yellowish-like liquid and produces an emulsion-like liquid when added to twice its weight of water. This is used as a base for the medical substances.

Solid Petroxolin contains White Wax in addition to the other ingredients of the Liquid.

LECTURE No. 17

Syrups are concentrated solutions of sugar and water, containing medical substances. Twenty-two official.

Syrup or Simple Syrup contains about 7 pounds of sugar to the gallon of water, and the Sp. G. is 1.313.

Syrup of Acacia contains Acacia, sugar and water.

Syrup of Citric Acid contains Citric Acid, Tr. Lemon, and syrup. It should not be dispensed unless free from moulds.

Syrup of Hydriodic Acid is 1¼%, made by mixing dilute Hydriodic Acid with syrup and water. Dose, 4 mils.

Syrupus Ferri Iodidi is Syrup of Iodide of Iron, 5% strength. Made by adding water to Iodine and Iron in a thin glass flask, allow to stand until it assumes a green color and has lost all Iodine odor, then filter and heat to boiling, then add sugar and water and a little dilute Hypophosphorous Acid. The acid is added as a preservative, that is, to prevent oxidation and loss of Iodine. The reason the solution is heated is to expel all air and prevent oxidation. The dose is 1 mil. (15 minims.).

Syrupus Pruni Virginianae is Syrup Wild Cherry. Made by macerating Wild Cherry Bark in water containing a little glycerin for 24 hours. This is then percolated with water, and sugar is added. Heat must never be employed in making this syrup, as heat destroys the Hydrocyanic Acid and Oil. The object of macerating in water is to develop up the Hydrocyanic Acid and Oil. The glycerin is used as a preservative. The amount of HCN in this syrup is indefinite, as it is very volatile. The dose of the syrup is 1 drachm.

Syrup of Ipecacuannae is Syrup of Ipecac. Made by adding Fluid Extract of Ipecac to Acetic Acid and water mixed. Set aside for 24 hours and filter, and add glycerin, sugar and water. The Acetic Acid is used to convert the Alkaloids of Ipecac into Soluble Acetates and the Glycerin to prevent fermentation. Expectorant dose, 1 mil. Emetic dose, 15 mils.

Syrupus Rhei, Syrup of Rhubarb, contains Fluid Extract Rhubarb, Spirits of Cinnamon, Carbonate of Potash, little water and syrup. The Potash is added to prevent precipitation of the Resin. Dose, 2½ drachms.

Syrupus Tolutans is Syrup of Tolu, made by rubbing up Tinct. Tolu with Magnesium Carbonate and part of the sugar, then add water and filter, and then add the remainder of the sugar. The Magnesia is used to aid the removal of finely precipitated matter

caused by the water and Alcoholic Solution of Tolu. It is used in Syrup of Ginger also.

Aromatic Syrup of Rhubarb is made from the Aromatic Tincture of Rhubarb, Carbonate of Potash, and syrup.

Syrupus Scillae Compositus, known as Cox's Hive Syrup, contains Tartar Emetic dissolved in warm water, Fluid Extract of Squills, Fluid Extract Senega, and syrup. Dose, 2 mils.

Syrup Sarsaparilla Compound is used as a vehicle for Iodides. It contains three fluid extracts.

Syrup of Squills contains Vinegar of Squills, sugar and water.

Syrup of Calcium Lactophosphate contains seven ingredients: Calcium Carbonate, Lactic Acid, Phosphoric Acid, Strong Orange Flower Water, Sugar, Glycerin, and Water. The change in this syrup: The Calcium Carbonate is converted into Calcium Acid Phosphate, Calcium Lactate, and Lactic Acid.

The following syrups are made from or contain a Tincture: Syrup of Orange, Syrup of Lactucarium, Syrup of Rhubarb Aromatic, Syrup of Tolu.

Syrup of Rose contains Fluid Extract of Rose, dilute Sulphuric Acid, and syrup.

Syrup of Hypophosphites contains a Hypophosphites of Calcium, Potassium, and Sodium. Dose, 10 mils.

Mucilagines are Mucilages. They are aqueous solutions of mucilaginous drugs. Two official.

Mucilago Acaciae, Mucilage of Acacia. Made by dissolving 35 grams of Acacia in 100 mils. of water. This preparation should be made fresh. In the last U. S. P. this preparation contained 33% Lime Water added as a preservative.

Mucilago Tragacanthae, Mucilage of Tragacanth. Made by macerating Tragacanth in boiling water and Glycerin.

Mucilage of Chondrus is Mucilage of Irish Moss. N. F.

Mucilage of Sassafras Medulla is Sassafras Pith. N. F.

Emulsions are aqueous preparations in which oleogenous substances are suspended by the aid of gums or other viscid matter. Four official.

Emulsion of Amygdalae is Emulsion of Almond. Made by

blanching the Almonds, rubbing up with sugar and Acacia and gradually add water. Ex. of Seed Emul.

Emulsion of Asafetida, called Milk of Asafetida. Made by rubbing up Asafetida with water gradually added until uniform product results. It contains 146 grs. Asafetida to 8 ozs. of water.

Emulsion of Turpentine and *Emulsion of Cod Liver Oil*, Acacia is the gum used. In making an Emulsion of Chloroform, use Tragacanth.

To clean a mortar that has contained Asafetida, use a solution of Caustic Potash Soap and water.

Melita, Honeys. Three official: Mel Depuratum, Mel Rosae, and Mel.

LECTURE No. 18

Glycerita. Glycerites are mixtures of medicinal substances in Glycerin. Five official.

Glyceritum Acidi Tannici, called Glycerite of Tannin. Made by dissolving Tannic Acid in Glycerin by the aid of a little heat. Antiseptic and astringent.

Glyceritum Amyli is Glycerite of Starch, called Glycerin Ointment. Made by rubbing starch with water until smooth, then add Glycerin and heat until a translucent jelly is formed. Heating drives off all water and makes it more valuable as an excipient in pill masses.

Glyceritum Phenolis is Glycerite of Phenol. Made by mixing Liquified Phenol with Glycerin. Dose, 5 minims.

Glyceritum Hydrastic is 100% and the U. S. P. furnishes assay. It should contain not less than 1.12 gm. of Ether Soluble Alkaloids in every 100 mls. Made by percolating the Hydrastis with Alcohol, recovering most of the Alcohol by distillation, then pour the remaining thick liquid in ice water and let stand for 24 hours. This precipitates out the yellow resin. Filter and add Glycerin. This solution is colorless and contains the white Alkaloid Hydrastine. The Glycerite of Hydrastis is the only preparation of Hydrastis that will mix with water without precipitation. The dose is 30 minims, 2 mls.

Glyceritum Boroglycerini, Glycerite of Boroglycerin, contains Boric Acid dissolved by heat in Glycerin.

Elixirs are sweetened alcoholic liquids intended to disguise the taste of bitter or nauseous drugs. Two official.

Elixir Aromaticum, called Simple Elixir, contains Compound Spirits of Orange, Purified Talc, Syrup, Alcohol, and water.

Elixir Glycyrrhiza, known as Elixir of Licorice, in U. S. P. 8 as Elixir Adjuvans, contains Fluid Extract Licorice and Simple Elixir.

Infusions are aqueous solutions made by treating the drug with either hot or cold water. Two official. They contain the water soluble principles of the drugs.

When Infusions are ordered and are not official, they should be 5% strength unless poisonous and then the strength should be stated by the physician. They should be allowed to macerate for half hour, and if the drug contains a volatile principle should be made with cold water.

Infusions are incompatible with salts of the heavy metals, like Iron, Mercury, and Silver, as the Infusions contain Tannin and it will precipitate them. It will also precipitate Alkaloids and their salts.

It is not advisable to let Infusions macerate too long as too much Tannin will be obtained. The usual time is one-half to one hour.

Infusions are more active than decoctions because the amount of heat employed in decoctions destroys the active constituents.

Infusion of Digitalis is 1½% strength. It is made by the hot process and Digitonin, the diuretic principle, is active. It must be freshly prepared from the leaves. Made by macerating Digitalis leaves in boiling water for one hour, filter and add Cinnamon Water and water. Dose is 4 mls.

Infusum Sennae Compositum is Compound Infusion of Senna, Black Draught. It contains Senna, Manna and Fennel macerated in boiling water one-half hour, then strain and add Epsom Salts to the liquid and strain again. Dose, 120 mls.

Decoctions are aqueous solutions made by boiling the drug in

water. None official, but should be 5% unless specified by the M. D.

Tinctures are alcoholic solutions of non-volatile substances. Fifty-four official; 28 of 54 are made by percolation, and they are mostly the Tinctures of potent drugs, and an assay in usually given.

Resinous Drugs, the Tinctures must be made by maceration. Example, Tinct. Benzoin. Tincture of Iodine is made by solution. Tincture of Chloride of Iron is made by dilution. That is four ways the Tinctures are made, yet we have some Tinctures made by special processes. Example, Tincture Cantharides, Opium, Squills, and Arnica.

Example of a Tincture made by maceration and percolation: Tr. Opium.

Tinctures must never be made from Fluid Extracts, as often the menstrum is not the same and the heat in preparing the F. E. destroys the drug.

The main advantage Trs. have over F. E. is, the menstrum is hydro-alcoholic and will mix with water without precipitating. Glycerin is used in the menstrum of some Trs. as a preservative, that is, hold the tannin in solution and prevent precipitation.

We have two Trs. made with a menstrum of Aromatic Spirit of Ammonia as a menstrum: Tr. Guaiac Ammoniated and Ammoniated Tr. Valerian.

The U. S. P. furnishes two type processes for preparing Tinctures: P. and M.

P. is as follows: Moisten the drug with sufficient menstrum to render it damp, then place in a percolator and without packing the drug, allow to stand six hours. Then pack firmly and pour upon it the menstrum, and when it begins to drop, close and allow to macerate 24 hours. Then allow the percolation to proceed, and gradually add enough menstrum to bring up to the required amount.

Type M. is: Macerate the drug with majority of the menstrum for three days, and filter and wash filter with remaining menstrum to bring up to required amount.

The following Trs. are assayed Biologically: Aconite (Guinea pig), Digitalis, Squills, and Strophanthus (frog), Cannabis (dog).

Assay processes for Tinctures containing Alkaloids are given by the U. S. P. and they number 18 in all. Example, Hydrastis, Cinchona, Nuxvomica, and most all the potent tinctures.

LECTURE No. 19

Tincture Benzoin Compound, known as Frier's Balsam and Turlington's Balsam. Made by macerating Benzoin, Aloes, Storax and Balsam of Tolu in Alcohol.

Tincture Cinchona is a standardized Tincture. In every 100 mils there should be one gramme of the Alkaloids of Cinchona. It is made from yellow Cinchona Bark.

Tincture Cinchona Compound, known as Huxham's Tincture. Made by percolating Red Cinchona Bark, Bitter Orange Peel, and Serpentina with a menstrum of Alcohol and water. It is also a Standardized Tincture and every 100 mils. should contain $\frac{1}{2}$ gramme of the Alkaloids of Cinchona. Dose, 4 mils.

Tincture Ferri Chloridi, Tr. Ferric Chloride, known as Tincture of Iron, Tincture of Muriate of Iron, and Tr. Steel. It is made by adding the Solution of Chloride of Iron to Alcohol. This Tincture must be placed in amber-colored bottles and stored in a cool place for three months before using. This is done to develop up the compound ethers which give to it its diuretic properties. The reason it is protected from light is to prevent Ferric Chloride from being converted into Ferrous Chloride. It enters into Basham's Mixture. It is a bright amber-colored liquid with an ethereal odor. It is 13% strength. It is used as a tonic. It has an astringent taste. Dose, 10 drops.

Tincture Lavender Compound is made by maceration. It contains Oil of Lavender, Oil of Rosemary, Powd. Cinnamon, Cloves, Nutmegs, and Red Saunders in Alcohol and little water as menstrum. The Red Saunders gives its red color.

Tincture Cardamon Compound contains Cochineal as the coloring agent.

Tincture Gentian Compound contains Gentian, Bitter Orange Peel, and Cardamon Seed, percolated with Glycerin, Alcohol and water.

Tincture Gambir Compound is made by maceration. It is known as Comp. Tr. Pale Catechu. It contains Cinnamon and Gambir.

Tincture Iodine contains 7% Iodine and 5% Iodide of Potash, in Alcohol and a little water. The Iodide of Potash is added to make the Iodine soluble when diluted with water, and also to prevent the loss of Iodine by evaporation. The dose is $1\frac{1}{2}$ minims.

Tincturae Nucis Vomicae is Tr. Nux Vomica. Made by percolating the Nux Vomica in a No. 40 powder with a mixture of three parts Alcohol and one part water. The rate of flow for this Tr. is 10 drops per minute. In every 100 mls. of the tincture there should be .25 gm. of the Alkaloids of Nux Vomica. The dose is 8 minims. It is known as Tr. Strychnine at the P. I.

Tincture Lactucarium is made by beating up the Lactucarium with sand to a coarse powder. Place in a bottle and add purified Benzine and let stand for 48 hours. Filter and throw the liquid away. Allow the Lactucarium to dry and then percolate with a menstrum of Alcohol, water and Glycerin. The reason this drug is first treated in this way is to remove the fixed oil. Dose, 2 mls.

Tincture Rhubarb Aromatic contains Rhubarb, Cinnamon, Cloves and Nutmegs, with a menstrum of Alcohol, water and Glycerin. Dose, 30 drops Arom. Syr.

Tincture Antiperiodic, N. F., is Warburg's Tincture.

Tincture Capsicum and Myrrh is Hot Drops.

Tincture Guaiac Co., N. F., Davies' Tincture of Guaiac.

Tr. Opii Crocata is Opium with Safron, known as Sydenham's Laudanum, N. F.

Pectorial Tincture is Bateman's Drops.

Tincture Sanguinaria contains a little HCl in the menstrum to develop up the Alkaloids and prevent precipitation. Dose, 15 drops.

Urine. The Specific Gravity of healthy urine is 1.020.

The normal constituents of normal urine are Phosphates and Chlorides.

The abnormal constituents are Albumen and Sugar.

A test for Albumen in Urine: Place a small amount of urine in a test tube, add a few drops of Nitric Acid, heat almost to boiling and let stand, and if a precipitate occurs it indicates Albumen.

A test for Sugar in Urine: Place a small amount of urine in a test tube and add an equal amount of Fehling's Test Solution and heat almost to boiling, and if sugar be present a red precipitate will fall to the bottom. This precipitate will be Copper Oxide.

Fehling's Test Solution is composed of two solutions. The first is made by dissolving Copper Sulphate in water and the second is made by dissolving Rochelle Salts and Potassium Hydroxide in water. Mix the two solutions and the mixture is Fehling's Test Solution.

Normal Urine is pale yellow. Dark amber Urine usually contains large amounts of Uric Acid.

There is 48 ounces of normal urine passed in 24 hours, and 960 gr. of solids. To obtain the amount of solid matter passed in urine, multiply the last two figures of the Specific Gravity by the number of ounces obtained and the result will be the amount of solids expressed in grains. Example: $20 \times 48 = 960$ grs.

A test for Bile in Urine: Add a few grains of sugar to the urine and boil and if a violet red color is produced it indicates the presence of bile.

Collodions are liquid preparations used externally. Three official.

Collodium is Collodion. It contains Pyroxylin (Gun Cotton), Ether and Alcohol.

Collodium Flexile is Flexible Collodion. It contains Collodion, Camphor, and Castor Oil. The oil makes it flexible.

Collodium Cantharidatum, Cantharidal Collodion, known as Blistering Collodion. Made by macerating Spaisch Fly in Acetone and Glacial Acetic Acid for 24 hours, then percolate with Acetone and evaporate most of the Acetone and mix the residue with Flexible Collodion.

Styptic Collodion, N. F., contains Tannic Acid and Flexible Collodion.

Pulveres, Powders, are mixtures of medicinal substances in fine powder. Seven official. They are:

Aromatic Powder, which contains Cinnamon, Ginger, Cardamon Seed and Nutmegs. It is used for making the Aromatic Fluidext.

Pulvis Cretae Compositus, Compound Chalk Po, contains prepared chalk, sugar and Acacia. Used for making Chalk Mixture.

Pulvis Effervescens Compositus, Seidlitz Powder.

Pulvis Glycyrrhiza Compositus, Compound Licorice Powder. Contains Oil of Fennel, Washed Sulphur, Po. Sugar, Senna and Licorice. Dose as a laxative, 60 gr.

Pulvis Ipecacuanhae et Opii, Dover's Powder. Contains 10 parts Po. Opium, 10 Po. Ipecac, and 80 parts Sugar Milk. Dose, 8 grs.

Pulvis Jalapae Compositus, Compound Powder of Jalap. Contains 35 grs. Powdered Jalap and 65 grs. Potassium Bitartrate. Dose, 30 grs. Hydrogogue Cathartic.

Pulvis Rhei Compositus, Compound Rhubarb Powder, known as Gregory's Po. Contains Rhubarb, Ginger and Magnesium Oxide. It is a pinkish powder and gradually becomes darker on exposure, due to the MgO acting on the coloring matter in the Rhubarb. The dose is 30 grs.

Triturationes, Triturations. Not but one official. They are powders that are made by mixing an active substance in a minute division by trituration with sugar of milk. Trituration Elaterin is the one. Contains 10%. The dose is $\frac{1}{2}$ gr.

Cerates are called that from Cera, meaning Wax. Three official.

Ceratum, or Simple Cerate, contains white wax and Benzoinated Lard.

Ceratum Cantharidis, called Blistering Cerate, contains Cantharides, Glacial Acetic Acid, Oil of Turpentine, Yellow Wax, and Benzoinated Lard. Enters into Cantharidal Plaster.

Ceratum Resinae, Rosin Cerate, called Basilicon Ointment. Contains Rosin, Yellow Wax and Lard.

Compound Rosin Cerate, known as Deschler's Salve. Contains Rosin, Yellow Wax, Suet and Linseed Oil.

Cerate of Lead Subacetate, N. F., is Goulard's Cerate.

Yellow Wax is preferred to *White Wax* as it will remain firm and free from rancidity longer.

LECTURE No. 20

The Symbol is the shorthand name for the element or abbreviation for the element. Example: S for Sulphur or Zn for Zinc.

The Chemical Formulae is Symbols placed so as to show their union and the result of their mixture.

Atomic Weight expresses how many times heavier other atoms are than the Atoms of Hydrogen. Example: Hydrogen is 1, Oxygen is 16 and Nitrogen is 14.

Molecular Weight is the combined Atomic Weights, thusly, HNO_3 is Nitric Acid. The Molecular Weight would be $\text{H}=1$, $\text{N}=14$, and $\text{O}=16$, $\text{X}_3=48$. Now, all these added would be the Molecular Weight of Nitric Acid.

The Proportion in which atoms combine depends on valency.

Valency, also called *Atomicity*, is the capacity every atom possesses of uniting with other atoms. The unit of measuring this capacity is the combined power of Hydrogen. Atoms that can hold one hydrogen atom in combination (or its equivalent of some other element) is known as univalent. Those capable of holding two is called bivalent, and those three are trivalent, and so on.

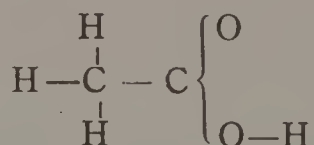
Hydrogen is taken as a standard for valence because one atom of Hydrogen is not able to hold more than one atom of another element in combination.

Valence, called *Quantivalence*, is the combining power of an element expressed in Hydrogen units.

An Element may have more than one valence. For example, Iron FeCl_2 is Ferrous Chloride acting as a dyad or combining power of two, and FeCl_3 , which is Ferric Chloride, has three. This is called Multiple Valence.

Bond expresses Valence. That is, an atom has as many bonds as it has valence. Example: H has one bond, thusly, $\text{H}-$, and Oxygen has two, thusly, $-\text{O}-$, and N has three, etc.

Bonds are used in the Graphic Formulae. It is used to show the arrangement of the atoms of a molecule, thusly, Acetic Acid. $C_2H_4O_2$, would be expressed thusly,



The Rational Formula separates the groups and shows the class of compounds a substance belongs to, as CH_3 , $COOH$.

The Molecular Formula shows the exact number of atoms in a molecule, as Acetic Acid $C_2H_4O_2$, and the *Empirical Formula* shows the simplest ratio of atoms in a molecule, as CH_2O .

In constructing the formula it is necessary to remember that when we replace H in an acid by anything, a salt is the result, and that the law of the reservation of mass must be followed. Example: ZnO plus $2HCl = ZnCl_2 + H_2O$.

Ic Acids produce "ate" salts, and *ous Acids* produce "ite" salts.

All the elements except Florine unite with Oxygen to form Oxides, as Ca is Calcium CaO is Calcium Oxide.

Hydroxides are formed by dissolving an Oxide in water. Ex., CaO plus H_2O equals $Ca(OH)_2$, which is Calcium Hydroxide. Hydroxides are often called Hydrates. And the Oxides and Hydroxides of the metals we term Alkalies, and the Hydroxides and Oxides of the non-metals, we call Acids.

An Acid is a compound that always contains Hydrogen, and all or part of it can be replaced by the base.

Hydracides are those that do not contain Oxygen. They are formed by uniting with elements like Cl, Br, by combining with Hydrogen only.

Oxyacids are the Hydroxides of the non-metals and contain Hydrogen and O.

A Salt is formed by the action of an acid on a base.

Radicals are a group of atoms capable of being transformed from one compound to another without being broken up. Example, CH_3 .

The Sulphides of all the metals can be converted into Oxides by roasting.

Cohesion is the attraction of like molecules.

Adhesion is the attraction of unlike molecules.

Chemical Affinity is the attraction of atoms for each other.

Potential Energy is stored-up energy.

Kinetic Energy is active energy.

The Law of Multiple Proportion. When two elements unite in more than one proportion, as N&O, the several proportions of O which combine with N fixed proportion of N bear a simple ratio to each other, the varying proportions are whole multiples, never fractional.

The Law of Conservation of Mass. In every chemical reaction the sum of the weight of the product is always equal to the sum of the weight of the factors.

Nomenclature. Sometimes an element in uniting with H&O to form an acid, unites with different quantities of Oxygen to form different acids, and the termination "ic" is then applied to the acid containing the most oxygen. And "ous" to the one containing less. Example, H_2SO_4 and H_2SO_3 . The termination "ate" is applied to salts from acids ending in "ic," and "ite" is applied to those from "ous" acids.

Then the prefixes are applied to those containing a greater amount of oxygen than the "ic" acids. Ex., per or super, as HClO_3 is Chloric Acid and HClO_4 is per Chloric Acid. Then, again, an acid containing less oxygen than the "ous" Acids, prefixes are used, as H_3PO_3 is Phosphorous Acid, and H_3PO_2 is Hypophosphorous Acid.

When an acid contains an element for its Acidulous Radical, the prefix Hydro is used, as HCl is Hydrochloric Acid.

"Ide" is used for those salts or compounds containing only two elements, as NaCl is Chloride of Sodium.

Mono means one.

Ter means three.

Duo means two.

Quandra means four.

Bis means two.

Tetra means four.

Bi means two.

Penta means five.

Hexa means six.

Poly means many.

Per means above.

Hyper means above.

Super means above.

Proto means low.

Pyro means that produced by high heat.

Sub means low.

Hypo means low.

Sesque means $1\frac{1}{2}$ times.

Ortho means regular.

Meta means different.

These are Monads or Univalent Compounds, having the combining power of one:

All Chlorides contain Cl.

All Iodides contain I.

All Bromides contain Br.

All Cyanides contain Cn.

All Nitrates contain NO₃.

All Chlorates contain ClO₃.

All Hydroxides contain OH.

All Acetates contain C₂H₃O₂.

These are Diads or Bivalent Compounds, having the combining power of two (2):

All Oxides contain O.

All Sulphides contain S.

All Sulphites contain SO₃.

All Sulphates contain SO₄.

All Carbonates contain CO₃.

These are Triads or Trivalents, having the combining power of three:

All Borates contain BO₃.

All Phosphates contain PO₄.

Sulphides of all metals can be converted into Oxides by roasting.

Carbonates contain Carbon and Oxygen and liberate CO₂ gas.

A *Medicine Dropper* should have an external diameter of 3 millimeters and should discharge distilled water so that 20 drops would equal one gramme. One millimeter is $\frac{1}{25}$ of an inch.

Dalton's Atomic Theory is: All matter is divisible into small particles called atoms, which are themselves indivisible, having fixed weight.

The Law of Multiple Proportion: When two elements unite, as N&O, the several proportions of Oxygen which combine with a fixed proportion of Nitrogen bear a simple ratio to each other (Beal's Law). The varying proportions are whole multiples, never fractional.

Sulphides are made direct from the element Sulphur.

Sulphates are made from Sulphuric Acid.

The termination "a" indicates the oxide of the element, as Soda.

The termination "um" or "ium" shows the element alone.

A *Subscript* is written at the lower right-hand corner of the Symbol.

A *Coefficient* is written before a formula and applies to all the atoms following.

The Alkalies Proper are Potassium, Sodium, Lithium, and Ammonium.

Caustic Alkalies are the Hydroxides of K & Na.

Carbonated Alkalies are the carbonates of K & Na.

The Volatile Alkalies are Ammonium Hydroxide and Carbonate.

Symptoms of Arsenate Poisoning: Vomiting of greyish or greenish color and pains in the stomach.

Symptoms of Phenol Poisoning: Burning in mouth and throat. breath strong with Phenol odor.

Symptoms of Strychnine Poisoning: Tetanic Spasms.

One Molecule of Phosphorous consists of four atoms.

LECTURE No. 21

A *Salve* is a stiff ointment to be applied to the skin.

A *Pomade* is a perfumed ointment.

Epidermatic Ointments are those intended to act upon the surface of the skin.

Endidermatic Ointments are those that penetrate into but not through the skin.

Diadermatic Ointments are those that go through the skin for constitutional effects. Example, Lanolin.

The character of the base of an ointment should depend on the therapeutic action desired. Lard is not so readily absorbed by the skin and Petrolatum not at all, but Wool Fat is readily absorbed.

Unguenta means Ointments. They are fatty preparations in-

tended for external use, the vehicle depending on the effects desired.

Twenty Ointments Official, and they are made in three ways: First, by Fusion; example, Ointment of Oxide of Zinc. Second, by Mechanical Admixture or incorporation; example, Yellow Oxide of Mercury and Belladonna. Third, by Chemical Reaction; example, Ointment of Nitrate of Mercury.

Ointments must be dispensed smooth and free from rancidity. Ointments that contain Tannin, or any free acid, must not be mixed with an iron spatula, on account of the chemical reaction.

In making Ointments of the Alkaloids, first rub up the Alkaloid with part of the base and then add the remainder.

Petrolatum will take up about 5% of water, Lard about 15%, and Lanolin about 505.

Unguentum is ointment or simple ointment. Contains white wax and Benzoinated Lard.

Ointment of Boric Acid is made by melting Paraffin and add White Petrolatum and Boric Acid.

Unguentum Aqua Rosae is ointment of Rose Water, called Cold Cream. It contains Spermaceti, White Wax, expressed Oil of Almond, Borax and Stronger Rose Water. The Borax is added to make the ointment white, and if it is ever prescribed with metallic salts the Borax should be left out.

Ointment of Belladonna and *Ointment of Stramonium* are both made from their respective solid extracts by first levigating them with dilute Alcohol and then adding Wool Fat (Hydrous) and Benzoinated Lard.

Ointment of Iodine is 4% strength. Made by rubbing up Iodine and Iodide of Potash with Glycerin until smooth, then add Benzoinated Lard. The Iodide of Potash is added to make the Iodine soluble. Metallic Spatula should not be used.

Ointment of Iodide of Potash, N. F., contains Iodide of Potash Sodium Thiosulphite, little water, and Benzoinated Lard. The Soda is added to prevent the liberation of Iodide. When the lard becomes rancid it liberates fatty acids which would attack the

Iodide and the soda neutralizes them. In making Ointment of Iodide of Soda you should use the same precaution.

Unguentum Hydrargyri Oxidum Flavum Ointment of Yellow Oxide of Mercury is 10% strength. Made by rubbing up the Mercury with little water, then add Lanolin and Petrolatum.

Ointment of Red Oxide of Mercury, N. F., is made the same way, and Metallic Spatula should be avoided in making both.

Ointment of Ammoniated Mercury is 10% strength and contains Petrolatum and Lanolin.

Unguentum Hydrargyri is Mercurial Ointment. It is 50%. Made by rubbing up Mercury (Quicksilver) with Oleate of Mercury, then adding lard and suet previously melted.

Unguentum Hydrargyri Dilutum is diluted Mercurial Ointment, called Blue Ointment. It is 30% strength and made by mixing 60 parts Ointment of Mercury with 40 parts Petrolatum. It is the one recognized by P. I.

Ointment of Oxide of Zinc, 20%, is made by rubbing up the Oxide of Zinc with one-fourth the melted lard and then add the remainder melted lard.

Ointment of Calamine, N. F., is known as Turner's Cerate.

An Ointment of Iodoform can be made smooth by first rubbing Iodoform up with Alcohol.

To remove the odor of Iodoform from utensils, first wash with Oil of Turpentine, then soap and water.

Unguentum Hydrargyri Nitratis, Ointment of Nitrate of Mercury, called Citrine Ointment, on account of its color. It is made from Mercury, Nitric Acid and Lard, as follows: Heat the Lard in a porcelain dish to about 45 degrees c., then add part of the Nitric Acid and continue the heat until reaction is complete, and stir until a bright citrine color is produced. Then dissolve the Mercury in the remainder of the Nitric Acid and mix the two. The change that takes place in this Ointment is: The Nitric Acid acts on the Olein in the Lard and changes it to Elaidin and Nitric Oxide, and the Nitric Acid and Mercury form Mercuric Nitrate. The commercial ointment varies from a light yellow to a dark red brown.

LECTURE No. 22

Crystallization is the process whereby substances are caused to form certain forms called crystals. The process usually takes place when the body passes from a liquid to a solid.

Crystals are obtained by the following methods: Sublimation, Precipitation, and from supersaturated solutions, the latter being the most favorable.

The use of the Nuclei, or a string, aids in Crystallization.

Solids sometimes mechanically enclose water. This is called *Interstitial Water*, because of the cracking noise produced by heating such a crystal. It is also called Water of Decrepitation.

If a substance absorbs moisture from the air, it is called *Hygroscopic*. If it absorbs enough to liquify it, it is called *Deliquescent*. Ex., Acetate Potash. Crystals that lose water on exposure to air are called *Efflorescence*.

Mother Liquor is the liquid that remains after crystals have been formed.

Substances that will not crystallize are called *Amorphous*.

The object of Crystallization is to purify substances.

We have six systems of Crystals: The Monometric, Dimetric, Trimetric, the Hexagonal, Monoclinic, and Triclinic.

Dialysis is separating crystallizable substances from those that will not crystallize, by placing a mixture of their solutions on a porous diaphragm, which has its under surface in contact with another liquid; the liquids will gradually diffuse and the substance which will crystallize will pass through, and are called crystalloids, and that which will not pass through are called colloids.

Pilulae, Pills, are small, solid bodies of globular or oval shape, intended to be swallowed and thereby produce medicinal effects. They should weigh from 2 to 5 grains.

A *Bolus* is a large pill, used in veterinary practice. They usually weigh from 10 to 100 grains.

Concentric Pills are those made up of different layers of drugs so as to dissolve and become active in different parts of the body.

Enteric Pills are those insoluble in the acid contents of the stomach, but will dissolve in the alkaline juices of the intestines. They are usually coated with Salol or Keratin. Keratin is made from horny matter by treating with ether, pepsin and HCl . It is not much used.

To coat pills with salol, melt the salol and dip the pills into it.

In coating pills with gold or silver, use the leaf and first roll the pill in a little mucilage of acacia. To make a pearl coated pill, roll in the mucilage of acacia and then in talc.

Excepients for Pill Masses. They are inert agents used to impart adhesiveness, develop adhesiveness, dry up liquids and those used with easily reduced chemicals.

A Few Good Excepients: Glucose, Honey, and Syrup are used to give adhesiveness; Dilute Alcohol, Water, Glycerin are used with drugs that give adhesiveness; Glycerite of Starch, or Tragacanth makes a good excepiant for drugs like Quinine or Acetanilid or bulky organic compounds; Kaolin with Petrolatum makes a good excepiant for chemicals like Permanganate of Potash, Nitrate of Silver, etc.

Mica Panis means crumbs of bread and is used for Croton Oil, and Starched Wax, made by shaving wax and drying and mixing with starch, is also used to a great extent for oils.

Powdered Soap is used for pills of resinous substances, like Opium, Asafetida and Aloes, by mixing the drug with the soap and then mixing with water. The soap in Aloes pills prevents the harshness of the drug and in Opium pills it makes the Opium more soluble.

Absorbent Powders are used to dust over pills and take up the moisture. Powdered Licorice, Althea and Lycopodium are the most common.

There are seven pills in the U. S. P.: Pills of Aloes, Asafetida, C. C. Pills, Pills of Phosphorous, Pills of Iodide of Iron, Pills of Carbonate of Iron and Compound Pills of Rhubarb.

Pills of Ferrous Iodide are made by rubbing up reduced Iron and Iodine in a mortar with a little water until the liquid ceases to have a reddish tint, then add Licorice, Sugar and Acacia;

make into a mass, cut and roll into pills and coat with an ethereal solution of Tolu. Each pill contains about $\frac{1}{2}$ gr. of Iron and $\frac{3}{4}$ gr. of Iodine in combination.

Pills of Phosphorous are made by dissolving Phosphorous in a little Chloroform by the aid of heat, then mix with Althea and Acacia and make into a mass with water or Glycerin, then roll into pills and coat with an ethereal solution of Tolu. Each pill contains $\frac{1}{100}$ gr. of Phosphorous. The Tolu prevents oxidation.

Ethereal Solution of Tolu contains 154 grs. of Balsam Tolu to 243 minims of Ether. We have two pills coated with this.

Pills of Ferrous Carbonate are known as Blaud's Pills.

Compound Cathartic Pills are official and contain 1 gr. Calomel to each pill.

Compound Rhubarb Pills contain Rhubarb, Aloes, Myrrh and Oil of Peppermint.

Vegetable Compound Cathartic Pills contain Comp. Ext. Colocynth, Ext. Hyoscyamus, Ext. Leptandra and Resins of Podophyllum, and Jalap. They do not contain Calomel. Dilute Alcohol is the excipient. They are in the N. F.

LECTURE No. 23

In Making Pills of Calcium Sulphide, Salicilate of Soda, or Iodoform, use Powder Tragacanth and Glycerin.

Pills of Aloes and Mastic, N. F., are known as Lady Webster Pills.

Antiperiodic Pills, N. F., are Warburg's Pills.

Pills of Iron, Quinine, Strychnine and Arsenic Strong are known as metallic pills. The mild are known as Aikin's Pills.

In making pills that contain Camphor and Chloral, use flour to take up the liquid and glucose for adhesiveness.

Camphor Pills, use Powdered Soap and Castor Oil as the excipient.

Compound Laxative Pills, N. F., are the same as Laxative Pills. They contain Aloin, Belladonna, Strychnine and Ipecac.

Gelatin Capsules are composed of Gelatin, Glycerin and water.

the amount of gelatin varying as to a hard or soft capsule desired.

Califacient Drugs are those that produce warmth.

Antilithic Drugs are those that prevent the formation of Calculi.

Emollient Drugs are softening or soothing.

Nephritics are drugs used in kidney diseases.

Medicines are substances used to ease pain or cure disease.

When you detannate a substance you take the Tannin from it.

Massae, Masses. Two official: *Massa Ferri Carbonatis* is Mass. of Carbonate of Iron, and is made from Ferrous Sulphate, Monohydrated Carbonate of Soda, and Syrup and Honey. The dose is 4 grains.

Massa Hydrargyri is Mass of Mercury, known as Blue Mass or Blue Pill, and is made by rubbing up Mercury with Oleate of Mercury and add Honey of Rose and rub until the Mercury is not visible under a magnifying glass magnifying ten diameters. Then add Licorice, Altheia and Glycerin and mix thoroughly. Dose, 4 grains.

Troches, often called Lozenges, are medical substances combined with sugar and Mucilage of Tragacanth and molded into shape. The following Troches are now official: Ammonium Chloride, Tannic Acid, Bicarbonate of Soda, Cubebs and Troches of Chlorate of Potash.

In making *Troches of Chlorate of Potash* be careful to avoid strong pressure, as they are liable to explode.

Emplastra are Plasters. There are seven official and two are Spread: *Emplastrum Spredrapum Capsici* and *Emplastrum Spredrapum Cantharidis*. Belladonna Plaster is made from Extract of Belladonna Leaves and is a standardized plaster. It contains 30% Ext. Belladonna Leaves and .4% Alkaloids.

Lead Plaster, known as Diachylon Plaster, contains Lead Oxide, Olive Oil and Lard.

Emplastrum Elasticum is Rubber Plaster, known as Rubber Adhesive Plaster. It is a mixture of rubber, resins and waxes with a filler of absorbent powder, such as orris root or starch, mechanically mixed and spread upon cloth.

Capsicum Plaster is made by spreading the Oleoresin of Capsicum on rubber plaster, spread on thin and leave a margin around t. Every 15 centimeters should contain 25 decigrams of Oleoresin.

Cantharides Plaster is made by spreading the Cerate of Cantharides on rubber plaster and leaving a margin around the sides. It is known as Blistering Plaster.

Emplastrum Sinapis is Mustard Plaster. Was called Sinapis Chartae or Mustard Papers. They are made by percolating black mustard seed in benzine to remove the fixed oil. The Mustard is then mixed with a solution of India Rubber in Carbon Disulphide and spread on cloth. Before applying the plaster it should be dipped in warm water for 15 seconds. This is done to develop up the Volatile Oil of Mustard to which it owes its virtue.

Rosin Plaster, common name Adhesive Plaster, contains Rosin Cerate, Yellow Wax and Plaster.

Z O Adhesive Plaster is made by mixing Oxide of Zinc with Rubber Adhesive Plaster and spreading on cloth. It is not official.

In making Lead Plaster, there is a chemical change that takes place. When Olin, Stearin and Palmatin of the Lard are heated with the Lead Oxide and water, Lead Oleate and Glycerin are formed. The Glycerin is washed out. Water is necessary in this mixture for the chemical change and the loss of evaporation from heating must be replaced, so use boiling water so as not to chill the mixture.

Icthyocolla Plaster is known as Court Plaster.

If at any time the surface of a plaster becomes hard it can be softened by applying a little Spts. Camphor.

Lamels are very small disks of Gelatin with Glycerin and some medicinal substance. Used to drop into the eye or make hypodermic solutions. None U. S. P.

Bacills are Troches in the form of short rods.

Terra Silicea, Purificata, Purified Silicious Earth, called Purified Kieselghur and Purified Infusorial Earth. It is used as a filtering medium for Aromatic Waters, but is better for Aromatic Elixirs, because they are filtered faster and are clearer.

The following Neutral Principles are official: Aloin, Chrysarobin, Elaterin, and Santonin.

Aloin is obtained chiefly from Curacao Aloes. It is a micro-crystalline powder, orange yellow color. Used as a laxative in $\frac{1}{4}$ gr. doses.

Chrysarobin is a mixture of neutral principles obtained from Goa Powder which is a substance deposited in the wood of *Vouacapoua Araroba*. It is an orange yellow powder used as an alterative and for making the ointment. It stains the skin but can be removed with a weak solution of Chlorinated Lime. Dose, $\frac{1}{2}$ gr.

Santonin is obtained from Levant Worm Seed. It is an anthelmintic in $\frac{1}{4}$ to $\frac{1}{2}$ gr. doses for children. Not repeated often.

Salicin and *Strophanthin* are true Glucosides, and Ammoniated Glycyrrhizin is a Glucoside prepared from Glycyrrhizin, the sweet principle of Licorine.

Salicin is obtained from *Salix*, the Willow or *Populus*, the poplar. It is used as an anti-rheumatic, anti-periodic and tonic. Dose, 15 grains.

Strophanthin is from *Strophanthus*. Used as a Cardiac Tonic in $\frac{1}{80}$ gr. doses.

Cachets, called Wafer Capsules, also Konseals, are made by pouring a mixture of flour and water upon hot greased plates and pressing as desired.

Tablets. We have one official; it is *Toxabellae Hydrargyri Chloridi Corrosivi*. It is poison Tablet of Corrosive Mercuric Chloride, called Corrosive Sublimate Tablets and Bichloride Tablets or Antiseptic Tablets. They should be angular in shape, each having the word "poison" and the skull and crossed bones stamped on them. Each tablet should weigh about one gramme and contain .5 grammes of Bichloride of Mercury and the remainder Sodium Chloride, which is added to make them soluble. They are to be colored blue with Sodium-Indigotin Disulphonate, and dispensed in glass containers with a red poison label.

Compressed Tablets are made by placing the medical substance in molds and pressing into desired shape. The substance should

be in its original granular condition or made so with sugar or Gum Arabic.

Tablet Triturates, often written T. T.'s, are made by triturating the medical substance with sugar of milk and dampen with water and press into shape.

Hypodermic Tablets are made in the same manner except sugar is usually used as the substance must be readily soluble.

Disintegrated Tablets are those made in such a manner they will break up in a few seconds when placed in water. They are made by adding dry starch to the substance during the process of making. This class of tablets is desired when insoluble substances, as Bismuth, Subnitrate and Acetanilid, is wanted.

Dilute Hydrocyanic Acid HCN is an organic acid 2% strength. Made by acting on Cyanide of Silver with Dilute Hydrochloric Acid and water. It is a sedative and frequently used in cough mixtures. It is very poisonous and the antidote is Ferric Chloride and inhalation of Ammonia. Dose is $\frac{1}{2}$ minim. It should be kept protected from light and heat in well cork stoppered bottles.

LECTURE No. 24

Pix Lithanthracis is Coal Tar, called Pix Carbonis. It is made by the destructive distillation of coal.

Phenol (C_6H_5OH), called Carboic Acid, known as Phenic Acid. It is a Hydroxabenzene obtained from Coal Tar by the distillation of the heavy oil. It is 97% strength. Seen in whitish mass, sometimes acquiring a pinkish tint, which can be removed by adding a little Alcohol and heating. The dose is one grain.

The Antidote is Calcined Magnesia or any Alkali, also Alcohol.

Phenol Liquifactum, Liquified Phenol. It is 87% strength. Made by heating Phenol on a water bath until liquified then adding one part water to nine parts Phenol.

Trinitrophenol, called Picric Acid, is made by acting on Phenol with Nitric Acid. It should be kept in well stoppered bottles in a cool place, and in transportation it is usually mixed with 20% water for safety. It is used in 1% solutions for burns. also in

urine analysis. It has been used internally in 1-grain doses as an antipyretic.

Cresol (C_7H_7OH), known as Cresylic Acid. It is a mixture of three cresols from Coal Tar. It is a constituent of Crude Carbohc Acid, from which it is separated by fractional distillation. It enters into Compound Solution of Cresol.

Crude Carbohc Acid, not U. S. P. It is a compound composed of Phenol and Cresol and is better than either as a disinfectant.

Naphthaline, known as Moth Balls, called Camphor Balls, not U. S. P. It is a Hydrocarbon obtained from Coal Tar. The dose is 2 grains.

Betanaphthol is a Phenol prepared from Naphthaline. When Naphthaline is heated with Sulphuric Acid two acids are obtained. The first, which comes at a low temperature, is known as Alpha-Naphthaline Sulphonic Acid; the second is Beta-naphthaline Sulphonic Acid, and when it is mixed with KOH and HCL and washed, Betanaphthol is produced. Seen in colorless or pinkish crystals or scales and has a Phenol odor. Used in skin trouble and to retard the growth of bacteria. Dose is 2 grs.

Bismuth Betanaphthol, known as Orphol. It is a greyish powder containing 75% Oxide of Bismuth.

Phenolphthaleinum is Phenolphthalein, a dibasic Phenol derivative. Made by heating 10 parts Phenol with 5 parts Phthalic Anhydride for 12 hours, then with Sulphuric Acid, and exhaust with boiling water and mix the residue with solution Sodium Hydroxide and precipitat with Acetic Acid. It is used as a purgative in one to eight grain doses.

Phenylis Salicylas is Salol. It is a Salicylic Ester of Phenol. It is made by acting on Salicylic Acid with Phenol. It is a white crystalline powder, very soluble in Volatile Oils and Chloroform, but insoluble in water and Alcohol. It is an intestinal antiseptic, being decomposed in the intestines into Phenol and Salicylic Acid. The dose is 10 grains.

Salicylic Acid is an organic acid prepared from Oil of Winter-green, also made from Phenol by acting on Sodium Phenol with Carbon Dioxide. It is insoluble in water and on that account its

salts, such as Salicylate of Soda, is used. Dose, 10 grains.

Resorcinol is Resorcin, is a diatomic Phenol made by fusing Sodium-Metabenzene-Disulphonate with Sodium Hydroxide. Also made by treating Asafetida with Caustic Potash. It is a white crystal and acquires a pink color on exposure to light and air. It is antiseptic, closely resembling Phenol in its action. Used mostly in skin troubles. Dose, internally, 2 grains.

Antipyrine, known as Phenazone, is chemically Phenyl-dimethyl-pyrozolon. It is analgesic in 5-grain doses and has a very depressing effect on the heart.

Acetanalid, called Antifebrin, is made by heating Aniline and Glacial Acetic Acid and subliming. It is antipyretic in 5-grain doses.

Methylthionine Chloridum is Methylene Blue. It is made by the action of Hydrogen Sulphide on an oxidation product of para-amido-dimethylaniline. It is a dark green powder soluble in water and Alcohol. It is an antiseptic, anodyne and antiperiodic. Dose, $2\frac{1}{2}$ grains.

Methylsalicylata, known as Oil of Wintergreen. It is made from Salicylic Acid, Methyl Alcohol and Sulphuric Acid by heating them. It is found naturally in plants and mostly in Oil of Wintergreen and Oil of Sweet Birch.

Benzosulphonidum is Saccharin. It is the anhydride of ortho-sulphamid-benzoic acid. It is made from the Coal Tar product, Toluene. It is a white powder, odorless and 500 times sweeter than sugar. It is used in diabetes in 3-grain doses. Its sale for beverages and foods is prohibited.

Benzol (C_6H_6), called Benzene, is found in the most volatile portion of Coal Tar. Aniline or Phenylamine is obtained from it by acting on it with Nitric and Sulphuric Acids.

Amines are formed by the replacement in Ammonia by Alcohol radicals.

Amides are formed by the replacement of Hydrogen in Ammonia with acid radicals.

LECTURE No. 25

Carbamide is Urea, is one of the end products of Metabolism. It is formed in the muscle but chiefly in the liver, and it is thought to be derived from Ammonium Carbamate by the successive loss of two molecules of water. It is prepared from serpent's excrement or by heating Ammonium Cyanate. It has been used in medicine in T. B.'s and diuretic in $\frac{1}{8}$ -grain doses.

Pyridin Bases are Aromatic Bases found in Coal Tar. Pyridin itself can be formed by the distillation of bone or from Nicotine. It is used in Denatured Alcohol and is the poisonous substance in Wool Alcohol.

Organic Chemistry is the Chemistry of the Carbon Compounds, that is, substances of animal or vegetable origin.

The main feature of Organic Compounds is that they consist of four elements: Carbon, Hydrogen, Nitrogen, and Oxygen. The different arrangement of these elements in the molecule is divided into the following groups: Carbohydrates, Hydrocarbons, Alcohols, Ethers, Esters, Aldehydes, Organic Acids, Keytones, Amines, and Amides.

Carbohydrates are compounds containing 6 (or some multiple of it) atoms of Carbon with O and H in proportion to form water. Example, sugar or glucose.

Hydrocarbons are the most extensive of Carbon Compounds. They are from Coal Tar or Petroleum. They contain Carbon and Hydrogen only. They are divided into two classes, Saturated and Unsaturated. Example, Methane CH_4 Fatty Compounds or Chain Compounds, and the Unsaturated, Benzene or Aromatic Compounds.

Alcohols are Hydrocarbons in which one or more Hydrogen atoms have been replaced by the Hydroxyl (OH). They are: mono, di, tri, or tetra, according to the number of Hydroxyls they contain.

Methyl Alcohol or *Ethyl Alcohol* are mono or primary Alcohols.

Menthol is a Secondary Alcohol, or di.

Glycerin is a Triatomic Alcohol.

Ethers are the oxides of the Alcohol radicals. Ex., $\text{C}_2\text{H}_5\text{O}$ is Ethyl Oxide.

Esters, known as Compound Ethers, are made by boiling acids or Acid Chloride with Alcohol. Ex., Ethyl Nitrite.

Aldehydes are compounds derived from Alcohols by the abstraction of two Hydrogen atoms. Ex., CH_2O is Formaldehyde.

Amines are bodies derived from Ammonia by replacing one or more Hydrogen atoms with an Alcohol radical.

Amides are formed by replacing the Hydrogen atom in Ammonia with an acid radical.

Phenols are Benzene Hydroxides. When you replace one or more of the Hydrogen atoms in Benzene with OH , a Phenol is the result.

Keytones are the Aldehydes of secondary alcohols.

Primary Alcohols, when oxidized, change into Aldehydes. *Secondary Alcohols* into Keytones.

CH_3OH is Methyl Alcohol, $\text{C}_2\text{H}_5\text{OH}$ is Ethyl Alcohol, $\text{C}_6\text{H}_5\text{OH}$ is Phenyl Alcohol, $\text{C}_5\text{H}_{11}\text{OH}$ is Amyl Alcohol, $\text{C}_3\text{H}_5(\text{OH})_3$ is Glyceryl Alcohol.

Fatty Acids and Fats are found in fixed oils and fats. We have two official: Oleic Acid, which is a yellow, oily liquid, and Stearic Acid, which is a colorless, waxy solid obtained from tallow. It enters into Glycerin Suppositories.

Red Oil is the commercial Oleic Acid and is obtained as a by-product in the manufacture of candles, and the Official Oleic Acid is made from this.

Empyreumatic Products are those made by destructive distillation, such as Oil of Cade. Empyreuma means odors given off during destructive distillation.

All Organic Acids contain the three elements C, O and H, because they contain Carbon they are classed as Carbon Compounds.

LECTURE No. 26

Cellulose ($C_6H_{10}O_5$) Also called *Ligin*, is a term applied to the woody fibre of plants. It is seen in its purest form as cotton or linen. When this Cellulose is treated with Alkalies it undergoes several changes, one of which is mercerisation. (Mercerised Cotton being a substitute for silk.) When it is treated with Strong Nitric Acid it forms explosive nitrates which are known as nitrocelluloses.

Gun Cotton is the Hexanitate of Cellulose. It is prepared by steeping Cotton or (Cellulose) in the strongest Sulphuric and Nitric Acids. Mixed with nitroglycerin, it forms what is known as blasting Gelatin.

Pyroxylin commonly called Collodion Cotton, is made by treating cotton with Nitric and Sulphuric Acids, but it is the tetranitrate of Cellulose. It is soluble Gun Cotton and resembles cotton in appearance. It should be kept in cartons away from fire and light. It is used for making Collodion.

When Cellulose is treated with strong Sulphuric Acid and Water, Parchment Paper is produced.

Parchment Paper is used in Pharmacy when the process of Dialysis is carried out.

When Cellulose is distilled out of contact with air it is decomposed into Methyl Alcohol, Formic Acid, Acetic Acid, Acetone and various Hydrocarbons. All of these products are obtained by the destructive distillation of wood.

Cotton when pure will sink when placed on water.

It is purified by washing in an alkaline solution, then in a solution of Chlorinated Lime, then in a weak solution of Hydrochloric Acid, then wash thoroughly with water. The loss in weight is about 10%.

Acetic Acid, $HC_2H_3O_2$ is 36% strength. It is made by distilling Oak Wood. The liquid first obtained is called Pyroligneous Acid or Crude Acetic Acid, which is treated with soda, ash and sulphuric acid and re-distilled. It is a clear, colorless

liquid used for making the diluted Acetic Acid and enters into Syrup of Ipecac.

Diluted Acetic Acid is 6% Strength. Made by mixing 5 oz. Acetic Acid with 26 ounces Distilled Water. It enters into Vinegar of Squills, Spirits Mindererus, and Bashams Mixture. The Dose is 30 minims.

Glacial Acetic Acid, Called Glacial on account of its glassy appearance at low temperature. It is 99% Strength. It is made by distilling Acetate of Soda with Sulphuric Acid. It enters into Cerate of Cantharidies and Cantharidal Collodion. Used for Corns and Warts.

No. 8 *Acetic Acid* is the 30%, it is not U. S. P. The Sp. G. of the various Acetic acids are about the same and it is the only case where Specific Gravity cannot be relied upon.

Trichloroacetic Acid is an organic Acid it is 99% St. Made by distilling a mixture of Chloral Hydrate and Nitric Acid. It is used as a caustic.

Pix Liquida is Tar. It is obtained by the destructive distillation of Pine Wood. It is usually obtained as a biproduct in the Mfg. of Charcoal. The Syrup and Ointment are official.

Oleum Picis Liquidæ Rectificatum is rectified Oil of Tar, called Oil of Tar in U. S. P. 8th.

Acetone is Chemically Dimethyl Keytone CH_3COCH_3 . It is made by distilling Acetate of Lime. It is used in Mfg. of Chloroform, also as a solvent for fats.

Creosotum is Creosote, known as Oil of Smoke. It is a mixture of Phenols, chiefly Guaiacol and Gresol. It is obtained by distilling beech wood (*Fagus Salvitica*) Tar. It is Anticeptic and Caustic. Enters into Creosote Water.

Creosote Carbonate, called Creosotal, is a yellowish thick liquid used as a substitute for creosote in tuberculosis in ten gr. doses. It is odorless.

Guaiacol... It is a colorless or yellowish Liquid obtained from Creosote or made artificially from Pyrocatechin. It is used in T. B. in 5 to 10 minim doses.

Guaiacol Carbonate is known as Duotal. It is a white powder given in 15gr. doses

Methyl Alcohol CH_3OH , known as Wood Alcohol, Wood Naphtha and Pyroxylic Spirits. It is obtained by the dry distillation of Wood. It is a poison, and when taken internally produces Blindness.

Methylated Spirit, known as Denatured Alcohol, is made from Ethyl Alcohol, Wood Alcohol and Benzine.

The Antidote for Wood Alcohol is Pilocarpine and artificial respiration.

Acidum Oxalicum is Oxalic Acid, is official as a reagent. It is made by treating Sawdust with Caustic Soda and Caustic Potash. It can be made by acting on Starch or Sugar with Nitric Acid $\text{H}_2\text{C}_2\text{O}_4$. The Antidote is Chalk, which forms in the Stomach an insoluble Oxolate of Lime, then give Emetics. It forms with Potash three Oxolates: The binoxolate and the quadroxolate are known as Salt of Sorrel or Salt of Lemon. They are sold to remove Iron-rust. Oxalic Acid is often sold for them but it is not correct.

LECTURE No. 27

Glucosum is Glucose, called Syrupy Glucose. It is obtained by the incomplete Hydrolysis of Starch.

Hydrolysis is a chemical process where a Chemical Compound takes up Hydrogen and Oxygen in the Proportion of forming water. Glucose and Grape Sugar are the same. Glucose being the liquid and Grape Sugar the solid.

Saccharum is Cane Sugar. The formular is $\text{C}_{12}\text{H}_{22}\text{O}_{11}$. It is obtained from Sugar Cane and Sorghum.

Rock Candy is crystalized Sugar.

Caromel is Burnt Sugar, made by heating sugar until the sweet taste is destroyed. It is used as a coloring Agent.

When Grapes are fermented we get Wine. When Apples are fermented we get Brandy.

Sweet Wine contains a large amount of Sugar

Dry Wine written Sec. meaning Dry, is one weak in Alcohol.
Rough Wine contains tannin.

There is, during the process of fermentation in making Wine from Grapes, a substance deposited on the side of the cask a crust called Argols.

Argols or Crude Tarter is purified we get Potassium Bitartrate or Cream of Tartar. The dose is 30 grains and used as a refrigerant.

Tartaric Acid $H_2C_4H_4O_6$ is an organic Acid prepared from Argols. It is a clear crystal and contains no water of Crystallization and that is why it is used in making Seidlitz Powders. There are three Salts of Tartaric Acid official, Potassium Bitartrate, Antimony and Potassium Tartrate and Potassium and Sodium Tartrate (Rochelle Salts)

Limonis Succus is Lemon Juice. It contains 8% Citric Acid.

Succus Citri is Lime Juice.

Citric Acid, is an Organic Acid prepared from Lemon or Lime Juice and contains one Molecule of Water. It is a translucent Crystal.

Syrupus Fuscus, is Treackle called Molasses. Is made by evaporating Sugar.

A test: When Tartaric Acid is heated it gives off odors resembling burning sugar. Citric Acid will not.

Succus Promorum is Apple Juice.

Alkaloids are often called the Basic principles of Plants. They resemble the Alkalies by uniting with acids to form salts. They exist in plants usually combined with Tannic Acid.

Morphine is combined in Opium with Meconic Acid.

Cinchona is combined in Quinine (reverse) with Kinic Acid.

Hydrastine in *Hydrastis* is not combined.

Alkaloids are precipitated from their solutions by Alkalies, Alkaline Salts, Tannic Acid, Donovans Solution and Meyers Reagent.

A *Reagent* is anything that produces a reaction to determine the presence or absence of a substance.

Myers Reagent is composed of Corrosive Sublimate and Iodide of Potash. It is Potassio Mercuric Iodide.

A *General* process for separating Alkaloids from plants: Exhaust the plant with Alcohol, shake with Ether, then with Ammonia Water and let stand and filter.

Morphine Sulphate and *Morphine Hydrochloride* are the two salts of Morphine official. The average dose is $\frac{1}{8}$ grain.

Codeine is known as Methyl Morphine. It is prepared from Morphine by Methylation.

Codeine Sulphate and *Codeine Phosphate* are the two Salts of Codeine. The average dose is $\frac{1}{2}$ grain.

Ethylmorphine Hydrochloride is known as Dionin. It is prepared from Morphine by Ethylation. The dose is $\frac{1}{4}$ grain.

Diacetylmorphine is known as Heroin. Made by treating Morphine with Acetyl Chloride and washing with Carbonate of Soda. The dose is $\frac{1}{20}$ grain Expectorant.

Apomorphine Hydrochloride is the Hydrochloride of an Alkaloid prepared from Morphine by the extraction of one molecule of Water. It has no Narcotic effects but is expectorant in $\frac{1}{20}$ grain doses and the most powerful emetic known in $\frac{1}{12}$ grain doses.

Diacetylmorphine Hydrochloride is made by mixing Heroin with distilled Water neutralizing with Hydrochloric Acid and crystallizing. It is used like Heroin in $\frac{1}{20}$ grain doses.

The following Salts of Quinine are official: Quinine Sulphata, Quinine Bisulphate, Quinine Hydrochloride, Quinine Hydrobromide and Quinine Salicyate. The average dose of them are $1\frac{1}{2}$ grains. The Antiamalaria dose is 15 grains.

We have two compounds of Quinine. The first is Quinine and Ura. It contains 58% Quinine and is very soluble in water. It is used Hypodermically for Malaria in 15 grain doses. It is also used as a local Anesthetic.

2nd. Is *Quinine Tannate*. It is a compound of Quinine and Tannic Acid and contains 35% Quinine. It enters in Troches of Quinine N. F.

Quinine Bisulphate is the acid sulphate of Quinine, it is 80 times more soluble and contains 15% less Alkaloid than the Sulphate. It is soluble in 9 parts of Water and 23 parts of Alcohol.

Quinine, *Quinidine*, *Cinchonine* and *Cinchonidine* are the most important Alkaloids of Cinchona. *Quinidine* is N. F., *Cinchonin Sulphate* and *Cinchonidine Sulphate* are both U. S. P. Dose $2\frac{1}{2}$ grains.

Cinchonidine is obtained as a biproduct in the Mfg. of Quinine.

Strychnine is an Alkaloid of *Nux Vomica*. It is seen in both powder and Crystal form. Used mostly for preparing the Salts.

Strychnine Sulphate and *Strychnine Nitrate* are Salts of *Strychnine*. The dose is $\frac{1}{40}$ grain.

Physostigmine is an Alkaloid from Ordeal Bean. The *Salicylate* is official.

Physostigmine Salicylate, known as *Eserine Salicylate* is a powerful Myotic and spinal depressant. Dose is $\frac{1}{60}$ grain.

Atropine is an Alkaloid obtained from *Belladonna* and some other plants of the *Solanaceae* Family. It is used to dilate the pupil of the eye. The properties are about the same as *Belladonna*. The dose is $\frac{1}{160}$ to $\frac{1}{60}$ grain. The Sulphate is official and the dose of the Sulphate is the same as the Alkaloids.

LECTURE No. 28

A test; *Apomorphine* should be rejected if it produces a greenish color when shaken with 100 parts of distilled Water.

Morphine Acetate is the most soluble of all Salts of *Morphine*. It loses its Acid easily and if it fails to dissolve in water add a drop of Acetic Acid.

Codein Phosphate is more soluble than *Codein Sulphate*, otherwise they are the same.

Cocaine is an Alkaloid from *Erythroxylon* Coca leaves. *Cocaine Hydrochloride* is its Salt. It is used as an anesthetic, anodyne and sedative. Dose $\frac{1}{4}$ grain.

Colchicine is an Alkaloid from *Colchicum*. It is soluble in 22 parts of Water. The dose is $1/120$ grain. It is more soluble in water than any other Alkaloid.

Cotarnine Hydrochloride, called Stypticin, is prepared from Cotarnine which is an Alkaloid prepared from Narcotine. Used to stop bleeding. Dose 1 grain

Homatropine Hydrobromide is the Hydrobromide of Homatropine, which is an Alkaloid obtained by the condensation of Tropine and Mandelic Acid. It is the most valuable Mydratic because the effects subside more rapidly. Dose is $1/120$ grain.

Pilocarpus, known as Jaborandi, contains an Alkaloid called Pilocarpine and its Salts are Pilocarpine Hydrochloride and Nitrate. The dose of both is $1/12$ grain. They are used as Diaphoretics, Diuretics and Sialogogues. The Nitrate differs from the Hydrochloride in not turning black when triturated with Calomel and is permanent in the air.

Scopolamine is an Alkaloid obtained from various plants of Solanaceae and the Hydrobromide is official and it is identical with Hyoscyne Hydrobromide which is from *Hyoscyamus*. It is used as a hypnotic and sedative in $1/200$ grain.

Hyoscyamine is an Alkaloid obtained from *Hyoscyamus* and others of the Solanaceae. Hyoscyamine Hydrobromide is official Salt. It is used as Narcotic and Sedative. Dose $1/200$ of a grain.

Veratrine is a mixture of Alkaloids, obtained from *Asagrea officinalis*, which is *Sabadilla* seed. It is used externally in neuralgia, rheumatism, etc. Very poisonous. It is Strenutatory.

Juvine is the Alkaloid from *Veratrum*. *Veratrum* is American Helebores used as Cardiac sedative.

Scoparious is Broomrape and contains an Alkaloid called Sparteine and the Sulphate is official. (not) Sparteine is a liquid Alkaloid and represents the cardiac principles. Scoparious also contains a Glucoside called Scoparin, which is the diuretic principles.

Hydrastine is an Alkaloid of *Hydrastis* and its Salt is Hyd-

rastine Hydrochloride. It is used as an alterative, tonic and stimulant. The dose is $1/6$ grain.

Hydrastinine Hydrochloride is an artificial Alkaloidal Salt, that is it is prepared from an artificial Alkaloid. It is an oxytotic in doses of 1 grain.

Emetine is an Alkaloid of Ipecac. The Salt of it is Emetine Hydrochloride. It is used in Dysentery and Pyorrhoea. The dose is $1/3$ gr.

Betaeucaine Hydrochloride is a synthetic derivative of Pipridine and it is used like Cocaine but does not come under the Narcotic law. The use is in Ointments and in Eye Solutions.

Caffeine is a feebly basic substance obtained from Tea, Coffee or Guarana. It has no definite chemical Salts but Citrated Caffeine is official.

Caffeine is a nerve stimulant.

Caffeine Sodio Benzoate is also U. S. P. It is a mixture of Caffeine and Sodium Benzoate. It is used as a Diuretic and Cardiac stimulant and on account of its solubility can be used hypodermically. Dose 3 gr.

LECTURE No. 29

Fermentation. When certain organic bodies are subjected to the action of water, air and a warm temperature, decomposition takes place, which is accomplished by minute organisms. When useful products are formed, it is called Fermentation, and when worthless products are formed, it is called Putrification.

Ferments are divided into two classes: Organized and Unorganized. The organized are such as bacteria, yeast and mold growths, and the unorganized like pepsin, pancreatin, and diastase.

Vinous Fermentation is when sugar is converted into Alcohol by the aid of a ferment.

Alcohol, C_2H_5OH , known as Rectified Spirit of Wine, often written S. V. R., meaning Spiritus Vini Rectificatus. It should contain 94.9% by volume of Ethyl Alcohol. It is made from corn or potatoes or other substances containing starch or sugar. If made from starch it is first converted into sugar by the action of the ferment Diastase, and the sugar is converted into maltose and then into Alcohol, and then purified by distillation. The chief impurity in Alcohol is Amyl Alcohol, known as Fusel Oil, and it is removed by digesting with charcoal and distilling. It can be deprived of its odor by treating with Permanganate of Potash and then distilling. The Sp. G. of Alcohol is .816 at 15.6 degrees, and .810 at 25 degrees.

Dehydrated Alcohol was official under the name of Absolute Alcohol. It is 99% strength Alcohol and 1% water.

Cologne Spirit is purified Alcohol.

Dilute Alcohol contains 49½% by volume of Alcohol at 15.6 d. Made by mixing equal volumes of Alcohol and water. If you mix 500 mls. of water with 500 mls. of Alcohol you will have 970 mls. finished product. The loss of 30 mls. is due to the rise of temperature and contraction in volume.

The U. S. Proof Spirits, called 100-proof, contains about 50% by volume of Alcohol.

Aether, called Ether, called Sulphuric Ether, is chemically Ethyl Oxide $(C_2H_5)_2O$. It is 96% strength. Sp. G. .716. Boils at

35.5 degrees. It is made by acting on Alcohol with Sulphuric Acid and distilling. It is a transparent, colorless liquid. Should be kept from fire and light, as it is very explosive and light decomposes it. It should be kept in partially filled containers and should not be poured from one vessel to another in the presence of gas light or fire. Its vapor is $2\frac{1}{2}$ times heavier than air. It is a valuable solvent. It is used as an anesthetic and preferred to Chloroform, as it does not depress the heart. It should not be used as an anesthetic if the container has been opened longer than 24 hours. The dose is 1 mil. It enters into Hoffman's Drops and Anodyne.

Aethilis Chloridum (C_2H_5Cl), Ethyl Chloride, known as Kelene. It is a haloid derivative of Ethyl. Made by the action of HCl on Absolute Alcohol. It should be kept in glass containers away from light. It is used as a local anesthetic by freezing.

Bromoform ($CHBr_3$) is a heavy liquid with an ethereal odor. Made by acting on Bromine and Alcohol in the presence of an Alkali. Used principally in whooping cough. The dose is 3 minims.

Aethilis Carbamas, Ethyl Carbamate, known as Urethane. Made by the action of Alcohol on Urea. It is seen in colorless crystals or scales, odorless with a saline taste. Used as a hypnotic in 15-gr. doses.

Chloroform ($CHCl_3$) is 99% strength. The remainder is Alcohol. Chemically it is Trichlormethane. It is a colorless liquid and should be kept in amber-colored bottles in a cool place, because on exposure to light and air it liberates Chlorine. It is not explosive but care should be used in vaporizing it before a flame, as poisonous gases are produced. It burns with a green flame. Its main source is from Acetone. It can also be made by acting on Chloral with an Alkali. It is soluble in 210 parts of water. It has a Sp. G. 1.47. Dose, 5 minims.

Chloroform is contaminated with an impurity called Chlorinated Pyrogenous Oil, which renders it unfit for use as an anesthetic and it must be removed.

Chloroform Venale is commercial Chloroform. Spirit Chloroform, liniment and water are official.

Chloral Hydratum, Chloral Hydrate, is made by passing Chlorine Gas through Absolute Alcohol for six weeks. It is a crystalline solid seen in crystals. It is chemically Trichloraldehyde. It contains one molecule of water, used as hypnotic, sedative and antispasmodic. The dose is 8 grs. When it is mixed with salts of the Alkaline Metals, such as Bromide of Soda, the odor of Chloroform is developed.

Hexamethylenamania, *Hexamethyltetramine*, called Cystotropine, Urotropin, Cystogen, and Formin. It is made by the action of Ammonia on Formaldehyde. It is soluble in water, slightly so in Alcohol. It is used as a urinary antiseptic, diuretic and antilithic. Dose is 4 grains.

Paraldehyde is a colorless liquid used as a hypnotic in 30 minim doses. It is made by passing HCl gas through Aldehyde. It has strong, pungent odor and a burning taste and on that account it is usually prescribed with Elixirs.

Paraformaldehyde, known as Paraform, called Trioxymethylene, is made from Formaldehyde. It is seen in white powder or masses. Used as an antiseptic in 8 gr.

Sulphonemethane, known as Sulphonal. It is a chemical compound obtained from Acetone. It is a white powder, odorless and nearly tasteless. Used as a somnifacient in 12-gr. doses.

Sulphonethylmethane is Trional. It is colorless, odorless and seen in white crystalline scales, very similar to Sulphonal.

Saccharures are preparations made by saturating sugar with a tincture and powdering. None official.

Oleosaccharures are preparations made by adding one drop of Volatile Oil to 30 grains of sugar. Very convenient method for administering medicine to children.

Young's Rule for administering medicine to children: Add 12 to the age of the child, then divide the sum by the age and divide the adult dose by the figures thus obtained.

LECTURE No. 30

In giving Castor Oil or Calomel to Children, you do not follow any rules. They can be given in larger doses according to age. In giving Opium or narcotics, not more than half the proportion obtained by Young's Rule should be given. It is safe to say that a child one month old $\frac{1}{20}$ of the adult does, and 3 months old $\frac{1}{15}$, 6 months old $\frac{1}{10}$, one year old $\frac{1}{8}$.

Volatile Oils are called Essential Oils. They are found in various parts of plants and constitute the odorous principle.

We have one Volatile Oil from the Animal Kingdom. It is Oil of Ambergris.

We have one Volatile Oil made by destructive distillation, Oil of Amber. It is a fossil resin from pine trees found in Europe.

When Volatile Oils are first prepared they are colorless, but on exposure to air they assume various colors. Example, Oil of Peppermint turns yellow, Oil of Cinnamon turns brown, and Oil of Worm Wood turns green.

When Volatile Oils are exposed to light and air they become thick and heavy. Ozone is developed, which bleaches the cork white, and there is deposited a resinous substance and the oil is said to be resinified, therefore all Volatile Oils should be kept in a dark place.

Volatile Oils are often adulterated with fixed oils to increase their weight. To detect this, use the paper test. Alcohol and Ether are the best solvents for Volatile Oils. Nitric Acid and Iodine destroy them. Alkalies have no effect on them.

Enfleurage is a term used when the odors of flowers are extracted by the use of fats. These layers of fats are called Pomades and are used to make a class of perfumes called Extracts. Cologne is made by adding Volatile Oils to Alcohol.

Volatile Oils are divided into four classes: First, is the Terpenes, with a formula $C_{10}H_{16}$; example, Oils of Lemon, Turpentine, and Orange. Second, is the Oxygenated, which contain C-O-H; example, Oil of Cinnamon. Third, is the Sulphurated, or

those containing Sulphur, Oil of Mustard. Fourth, is the Nitrogenated, or those containing Hydrocyanic Acid, Oil of B. A.

Oils of Lemon and Orange are prepared from the peel of the fruits and can be prevented from becoming terebenthinated if they are mixed with an equal volume of Alcohol. If either oil has the odor of Turpentine it should not be dispensed. Oil of Lemon contains 4% Aldehydes calculated as Citral.

Oil of Peppermint is distilled from Peppermint and should contain 50% menthol. When Oil of Peppermint is frozen it becomes a crystalline mass, which shows that it contains the Menthol.

Menthol is a secondary Alcohol obtained from Oil of Peppermint. It is seen in colorless crystals with a characteristic odor, and when rubbed with equal weight Camphor, Chloral, Thymol or Phenol it liquifies.

Oleum Pini Pumilions is a Volatile Oil called Oil of Dwarf Pine Needles. It is distilled from the fresh leaves of *Pinus Montana*.

Oleum Rosmarini is Oil of Rosemary is a Volatile Oil distilled from fresh flowering tops of *Rosemarinus officinale*. It enters into Soap Liniment and Compound Tr. of Lavender.

When *Thyme* is first distilled we get a red oil known to the trade as Oil of Origanum, and when this is distilled we get a colorless Volatile Oil of Thyme.

Oil of Eucalyptus is a Volatile Oil distilled from *Eucalyptus* leaves. It contains 70% Eucalyptol, which is called Cineol.

Oil of Cassia is the same as Oil of Cinnamon. The Chinese Oil of Cinnamon is the one official. Cinnaldehyde is synthetic Oil of Cinnamon.

Oil of Cloves contains 82% Eugenol, which is a phenol and usually prepared synthetically and for that reason it is called Artificial Oil of Cloves.

Oil of Sassafras contains Safrol which was official as Artificial Oil of Sassafras.

Oil of Anise, also called Oil of Star Anise and Oil of Fennel, contain a principle called Anethol. Both of these oils become solid during cold weather and this solid portion is Anethol, and the U. S. P. states that they should be warmed before dispensing.

Methyl Salicylate is the same as Oil of Wintergreen. It can be made from the Sweet Birch Bark or Gaultheria Leaves or prepared synthetically, but the U. S. P. states that the label must show its source. It is known as Oil of Teaberry, Oil of Chickerry and Oil of Partridgeberry. It is the heaviest Volatile Oil, having a Sp. G. 1.185. Volatile Oils are usually lighter than water.

Benzaldehydum is sythetic Oil of Bitter Almond. It is used for flavoring as it contains no Hydrocyanic Acid. It is made from Toluene by acting on it with Chlorine and Magnesium Oxide. It is 85% pure.

Eugenol is synthetic Oil of Cloves. The last three is official, but the next are not. Cinnaldehydum, Artificial Oil of Cinnamon, and Safrollum, Artificial Oil of Cinnamon. Oil of Camphor is obtained as a byproduct in manufacturing Camphor. It is similar to Oil of Sassafras and is used to adulterate it.

Amygdalae Amara is Bitter Almond. It contains a ferment called Emulsin and a ferment called Amygdalin, and when they are macerated in water they act on each other and form HCN and Volatile Oil of Bitter Almond.

Oil of Bitter Almond contains from 2 to 4% HCN. The dose is $\frac{1}{2}$ minim. When it is allowed to stand for sometime it assumes an acid reaction due to the formation of Benzoic Acid, and should not be dispensed. The spirit and water are U. S. P.

Oleum Sinapis is Volatile Oil of Mustard. Made by macerating black mustard seed in water which causes the Glucoside Sinigrin and the ferment Myrosin to act on each other and form the Volatile Oil, which is then distilled off. It is used externally and the dose is $\frac{1}{8}$ minim. It must contain 92% Allyliso-thiocyanate, which is its chemical name.

Oil of Erigeron, known as Oil of Fleabane, not U. S. P., is a volatile oil used as Hemostatic in uterine Hemorrhages in 15-drop doses. It can be distinguished from Oil of Turpentine and Oil of Fireweed by being soluble in equal parts water. It is often adulterated with them.

Oil Chenopodium is Oil of American Worm Seed and is used as anthelmintic in 3-minim doses.

LECTURE No. 31

Purified Talc, called Talc or French Chalk or Soapstone. It is Magnesium Silicate, found in large quantities in N. C. It is a greyish white powder insoluble in water and for that reason it is used as a filtering agent, and the U. S. P. directs that it should be not finer than a No. 100 powder.

Piperin is a feeble basic substance obtained from black pepper and should be yellow in color, due to adhering oil and resin and they give it its value. When it is white it has no value.

Turnea Aphrodisiaca is Damiana; not U. S. P.

Acid Boricum, Boric Acid, called Boracic Acid, is the only solid inorganic acid. It is a fine white powder or crystals having a slight acid reaction. It is made by acting on Borax with HCl. It is soluble in four parts of Glycerin and 18 parts of water. We mean by that that one gramme will dissolve in 18 mls. of water. When it is heated to 100 degrees Metaboric Acid is produced. A solution of Boric Acid burns with a greenish flame. The dose is 8 grs. The Ointment and Glycerite is official.

LECTURE No. 32

All *Dilute Acids* are 10% strength, except Dilute Acetic which is 6%. Dilute Hydrocyanic is 2% and Dilute Nitro Hydrochloric is 22%. All acids, strong or dilute, when taken internally should be well diluted and taken through a straw or glass tube to prevent injury to the teeth.

Inorganic Acids are known as Mineral Acids. They are the acids of Inorganic Chemistry. Combinations of Hydrogen, as well as H & O yield these acids (with non-metallic elements). They all contain Hydrogen and all or part of it is capable of being replaced by a metal. Acids are called the Salts of Hydrogen. Inorganic Acids are divided into two classes:

First is *Hydroacids*, often called Binary Acids. They do not contain oxygen. Ex., Hydrochloric Acid HCl , etc.

The second class are called *Oxyacids*, known as Ternary Acids. They contain O.

Acids have a sour taste and a corrosive action. They will turn blue litmus paper red. With the exception of Boric Acid, all Inorganic Acids are liquid.

The following Hydroacids are official: Dilute Hydriodic (HI) $9\frac{1}{2}$ to $10\frac{1}{2}\%$ strength, Dilute Hydrobromic Acid (HBr.), Hydrochloric Acid (HCl), Dilute HCl .

The following Oxyacids are official: Hypophosphorous HPH_2O_2 (30%) and the Dilute; Nitric Acid, 68% strength (HNO_3); Nitrohydrochloric, 18 Nitric and 82 HCl , and the Dilute; Phosphoric (H_3PO_4), 85% and Dilute; Sulphuric (H_2SO_4) and Dilute; Aromatic Sulphuric.

Hydrochloric Acid, HCl , known as Muriatic Acid, also called Spirit of Salt, 32%. It is made by acting on Salt with Sulphuric Acid, 2NaCl plus H_2SO_4 — MCl plus NaCl plus NaHSO_4 . The dose is 5 to 10 minims.

Hydrochlorate and Muriate are the same.

Commercial Hydrochloric Acid has no definite strength. It is not official and has no medicinal value. Its yellow color is due to a trace of iron.

When the stopper is left out of the bottle of HCl and the fumes arise, they become white, due to the ammonia in the air, and forming Ammonium Chloride.

Dilute Hydrobromic Acid, Hbr. Made by distilling Potassium Bromide, Sulphuric Acid and water together. It is used as a nervine and hepatic in 15-minim doses.

Dilute Hydriodic Acid, HI , is made by mixing Iodide of Potash and Hypophosphite of Potash in water by aid of heat. Then dissolve the Tartaric Acid in dilute Alcohol and mix the two solutions and place on ice for several hours. Then filter and evaporate the Alcohol with little heat and make up loss with distilled water. The Hypophosphite of Potash is used to prevent loss of Iodine and decoloration. The dose is 5 to 10 drops.

Phosphoric Acid, H_3PO_4 , is 85% strength, often called Syrupy Phosphoric Acid on account of its syrupy appearance. It is miscible in all proportions with water or Alcohol and its solutions give a strong acid reaction. It produces a yellow precipitate with Silver Nitrate. It is Tribasic. The dilute acid is a tonic and refrigerant in 30-minim doses.

Hypophosphorous Acid, H_3PO_2 , is 30%. Made by acting on Barium Hypophosphite with Sulphuric Acid. It is a colorless liquid used for preparing the dilute acid.

Dilute Hypophosphorous Acid was introduced into the U. S. P. as a reducing agent. When added to Syrup of Iodide of Iron it prevents decomposition and when added to Syrup Hypophosphites it aids solubility.

Nitric Acid, HNO_3 , is 68%. It is often called Aqua Fortis (strong water). It is made by acting on Nitrate of Soda with Sulphuric Acid, NaNO_3 plus H_2SO_4 — NaHSO_4 plus HNO_3 . The dose is 3 minims well diluted. When it is applied to the skin it produces a yellow color due to the formation of Xanthoproteic Acid. It is a colorless fuming liquid. It dissolves copper with a blue solution. It dissolves mercury, silver and other metals with evolutions of red fumes by which it can easily be detected.

LECTURE No. 33

Acidum Nitrohydrochloricum, Nitrohydrochloric Acid, called Nitromuriatic Acid, often called Aqua Rego (crown water) because it will dissolve gold. The reason it will dissolve gold is due to the free Chlorine it contains. It is made by mixing 18 volumes of Nitric Acid with 82 volumes of Hydrochloric Acid. It must be made in a glass vessel and let stand until effervescence has ceased, then pour into amber-colored bottles with glass stoppers and the bottle must not be more than half filled, on account of escaping gas which would burst the bottle. It should never be placed in the bottle or dispensed until all effervescence stops, which usually requires about 24 hours. The Nitrosyl Chloride and free Chlorine are developed during this time. It is a golden yel-

low liquid with a strong odor of Chlorine. The dose is 3 minims well diluted.

Caution. This acid should never be dispensed in combination with infusions or tinctures to avoid explosion; that is, the bottle would burst in the patient's hands. It is used as a hepatic.

Dilute Nitrohydrochloric Acid is made by mixing Nitric and Hydrochloric Acids, allowing them to stand until all effervescence ceases (24 hours), then adding water. This must be made according to the above and not by the rapid method of adding the water at once, as it would not produce the official preparation. It is a colorless liquid with a faint odor of Chlorine. The dose is 15 minims. The U. S. P. states that the strong acid must not be dispensed unless it will immediately liberate Iodine when one drop of acid is added to a solution of Iodide of Potash 1 to 5, and the Dilute 5 drops to a solution 1 to 5.

Sulphuric Acid, H_2SO_4 , is 94% strength, Sp. G. 1.83. It is made by burning Sulphur or Iron Pyrites and allowing the products of combustion, which is Sulphur Dioxide (SO_2), to mix with nitrous fumes obtained by the decomposition of Sodium Nitrate, which changes the SO_2 into SO_3 and this is mixed with water and makes H_2SO_4 . This is called the Lead Chamber Process. When it is made from Iron Pyrites it is often contaminated with Arsenic and for that reason Sulphur is preferred. Phosphoric Acid and all Phosphates are liable to be contaminated with Arsenic, due to the fact that Phosphoric Acid is made by acting on Phosphorous with Sulphuric Acid.

Aromatic Sulphuric Acid, called Elixir of Vitriol. Made by carefully adding H_2SO_4 to Alcohol and adding Tr. Ginger and Oil of Cinnamon. The dose is 15 minims for night sweats. It was used as an excepiet for Quinine Pills. It is 20% strength.

Sulphuric Acid is called Oil of Vitriol. The Aromatic, Elixir Vitriol, Copper Sulph., Blue Vitriol, Iron Sulphate, Green Vitriol, Manganese Sulphate, Pink Vitriol, Iron and Ammonium Sulphate, Violet Vitriol, Sulphate of Soda, Vitriolated Soda.

Sulphurous Acid, H_2SO_3 , is 6%. Made by distilling a mixture

of Charcoal, water and Sulphuric Acid. It is used largely to prevent fermentation in the preservation of foodstuff.

Sulphur Dioxide, SO_2 , called Sulphurous Oxide and Sulphurous Anhydride. It is a colorless gas having powerful bleaching qualities. It is produced by burning Sulphur in contact with air or oxygen. It is found in small quantities in large cities, coming from the Sulphur in the coal that is burned.

The Antidote for Inorganic Acids is Calcined Magnesia or Alkalies. Never use water as that intensifies it. If spilled on hands, use Calcined Magnesia.

Antidote for Alkaloids is Tannic Acid and Emetics.

Anesthetics are agents which temporarily destroy sensation. They are divided in two classes: General Anesthetics, such as Ether and Chloroform; Local, such as Cocaine and Ethyl Chloride.

A test to distinguish Morphine from Quinine: Nitric Acid produces a red color with Morphine.

LECTURE No. 34

Fluid Extracts. In the 8th U. S. P. we had 85; in the 9th we have 49. In the 8th we had three made with a menstrum of Acetic Acid and water, but they are now made different. They were Lobelia, Squills and Sanguinaria, the latter is now N. F.

Lobelia, the menstrum, is now 5 parts Acetic Acid, 50 parts Alcohol and the remainder water.

Squills is now 2 parts Alcohol and one part water.

Sanguinaria, the menstrum, is Citric Acid, Alcohol and water.

The main advantages of Fluid Extracts: Permanence, concentration, and the uniform relation existing between the F. E. and drug. They are now made by four-type process in the U. S. P.—A, B, C, and D.

Type "A" includes those made with a menstrum of water and alcohol or alcohol. Example, Buchu, Belladonna, and Digitalis. Twenty-seven are made this way.

Type "B" is those that contain Glycerin or an acid in the menstrum. The Glycerin is used to soften the drug and as a solvent for the Tannin and acts as a preventive from precipitation. The

addition of an acid is to convert the alkaloids of the drug into soluble salts. Eleven F. E.'s are made by Type "B." Ipecac, Cinchona and Ergot contain HCl in the menstrum.

Type "C" is those made by fractional percolation. We have three made by this process: Aconite, Aromatic Fluid Extract and Fluid Extract Bitter Orange Peel.

Type "D" is made by extracting the drug with boiling water, concentrating and adding alcohol: Cascara, Frangula and Triticum.

We have five made special processes. They are: First, Aromatic Cascara, made by adding Magnesium Oxide to the bark and moisten this with boiling water and macerate for two hours, then percolate, evaporate the percolate and while warm add Extract of Licorice, cool and add Glycerin, Saccharin dissolved in alcohol containing Oils of Cinnamon, Anise, Coriander and Methyl Salicylate; then add water qs. It only contains 25% alcohol..

Fluid Extract of Licorice and Senega are examples of F. E.'s with Alkaline menstrums. Licorice contains Ammonia Water to develop up the sweet principle and Senega to dissolve the Pictin. Chloroform Water is used in F. E. Licorice in place of plain water because the Chloroform is a preservative.

Fluid Extract of Colchicum Seed is first percolated with Benzin which removes the fixed oil, then proceed as in the Type "A."

Fluid Extract Staphisagriae is chilled and filtered after percolation to remove the oil.

Type "A" Process is as follows: Take 1,000 grms. of the drug and moisten with sufficient menstrum and let stand for six hours in the percolator, then add more menstrum and when it begins to drop, cut off and let stand for 48 hours, then percolate at the rate of 10 drops per minute until you get 850 mls., set this aside and continue percolation until the drug is exhausted and take this liquid and evaporate to a soft extract and dissolve in the reserved portion, then add alcohol to bring up to the required amount, 1,000 mls. Percolation with incomplete exhaustion is percolating in the usual way but when the amount has reached three-fourths the weight of the drug it is stopped. F. E.'s are

made from green drugs by expressing the juice and adding to the menstrum and percolating, but this is not U. S. P.

A *Precipitate* is sometimes in Fluid Extracts, caused by heat in making or the temperature being changed. They should not be filtered.

The *Official Arsenic Antidote* is Ferric Hydroxide with Magnesium Oxide, made by mixing Solution of Ferric Sulphate with water in one bottle, then rub up MgO with water and keep in another bottle and when wanted for use mix the two solutions. The chemical change in this mixture is the Ferric Sulphate is converted into Ferric Hydroxide and the Magnesium Oxide is converted into Magnesium Sulphate and Magnesium Hydroxide. This is called a chemical antidote because Arsenate of Iron is formed in the stomach and it is thrown out by metics. Dose, 4 ounces.

The *antidote for Ammonia* is weak acids, like vinegar. For Phosphorous is old or oxidized Oil of Turpentine; any other oil intensifies it. Paris Green is Arsenite of Copper, so give the arsenic anitdote.

LECTURE No. 35

Hydrogen, symbol H, valence 1, atomic weight 1, molecular weight 2. It is a gaseous element of the highest importance, being the standard for atomic and molecular weight at one time. It is the lightest element known. It is 14.5 times lighter than air. It is a colorless, odorless, tasteless gas and forms the following corresponding acids: When it unites with Chlorine it forms HCl, when it unites with Iodine it forms Hydriodic Acid HI, when it unites with Bromine it forms Hydrobromic Acid HBr., when it unites with Fluorin it forms Hydrofluoric Acid. Hydrogen burns with a bright light. It is the most diffusible of all gases.

Diffusion is the property gases have with mixing with each other, even in opposition to force. Light gases diffuse quicker than heavy ones.

The Law of Diffusion of Gases: Gases diffuse inversely proportional to the square roots of their Specific Gravity. V. E. H.—

1 Oxygen 16. The square root of them is 1 and 4, therefore Hydrogen diffuses 4 times than that of O. It can be made by acting on Zinc with Sulphuric Acid, Zn plus H_2SO_4 equals ZnSO_4 plus H_2 . But Hydrogen made in this manner is more or less impure, and can be purified by first passing through Lead Nitrate, then Silver Sulphate and then KOH and last Sulphuric Acid.

Hydrogen is a reducing agent, that is, it replaces the oxygen, as in making reduced iron.

The Halogen Group, called Salt Producers.

Chlorine, Cl , is a gaseous element. *Fluorine*, Fl , is a gaseous element. *Iodine*, I , is a solid element. *Bromine*, Br ., is a liquid element.

The Halogens are all univalent. Their Oxides combine with water to form Acids. They are sometimes called non-metals. Their salts usually end in "ide."

Chlorine, Cl , valence 1, atomic weight 35.5. It forms salts called Chlorides. It is found in the vegetable to a great extent, but is found in the Animal Kingdom combined with Sodium. It is found in sea water and in the salt wells of the U. S. It is about $2\frac{1}{2}$ times heavier than air and can be collected by displacement. It bleaches all vegetable matter in the presence of moisture by uniting with Hydrogen, which liberates the Oxygen and thereby oxidizing and bleaching the substance. It will not bleach mineral colors. It can be made by acting on Chlorate of Potash with Hydrochloric Acid.

A test for Chlorine and Chlorides: Nitrate of Silver produces a white precipitate.

A test for Chlorates: When heated they give off oxygen.

Chlorine forms the following Oxides: Cl_2O is Chlorine Monoxide; Cl_2O_4 is Chlorine Dioxide; it is produced when Sulphuric Acid is added to Chlorate of Potash. Cl_2O_7 is Chlorine Heptoxide. Chlorine forms the following Acids: HCl is Hydrochloric Acid; HClO is Hypochlorous Acid, made by passing Cl_2O into water; HClO_2 is Chlorous Acid; HClO_3 is Chloric Acid, and HClO_4 is Perchloric Acid.

Chlorine Water contains .4% Chlorine Gas. *Laborraque's Solu-*

tion contains 2.5% Chlorine Gas. *Chlorinated Lime* contains 30%.

Calx Chlorinata is Chlorinated Lime. Made by acting on Calcium Hydroxide with Chlorine Gas. It is called Chloride of Lime, known as Bleaching Powder. It is usually seen on the market in $\frac{1}{4}$ -lb. cans.

Bromide, Br., atomic weight 80, valence 1. It makes salts called Bromides. It is a dark reddish brown, heavy liquid, poisonous to inhale and very irritating to throat, lungs and eyes. The source is from the brine wells of Pennsylvania. Bittern is the name of the mother liquor of the manufacturing of salt. A test for Bromine and Bromides: Nitrate of Silver produces a yellowish white precipitate.

Iodine, I, atomic weight 126. It forms salts called Iodides. It is a heavy blueish black non-metallic element, obtained from a seaweed called Kelp, also prepared Chile saltpetre. It is insoluble in water but is made so by the addition of Iodide of Potash.

When Iodine is dissolved in Alcohol it has a red color and when dissolved in Carbon Disulphide or Chloroform it has a violet color. A test for Iodine: Starch turns it blue. A test for Iodides: Add Chlorine Water, which liberates the Iodine, then add starch and it turns blue.

The Antidote for Iodine: Starch followed by emetics. Chlorine and Bromine have a stronger affinity for Hydrogen than Iodine, therefore, both will liberate Iodine from HI.

Fluorine, Fl., atomic weight 18.9, valence 1. Its salts are seldom used in medicine. It unites with Hydrogen and forms Hydrofluoric Acid, which is used in the arts for etching glass. It is very poisonous. It corrodes glass, porcelain, earthenware, and the metals, with the exception of gold, platinum and lead. It occurs in nature as Cryolite.

LECTURE No. 36

Oxygen, O, atomic weight 16, valence 2. It exists in the air and is 16 parts by weight of water, and that accounts for fish being able to live in water. It is heavier than air. It is a colorless,

odorless, tasteless gas and is a powerful supporter of combustion, and a fat splinter of wood if ignited will burst into flame if placed in Oxygen. It is a non-poisonous gas and is being continually absorbed by living animals during the process of respiration. It is now in the U. S. P. and for convenience it is compressed in metal cylinders. It can be made by heating Chlorate of Potash, thusly: KClO_3 plus heat equals KCl plus O_3 . It unites with all the elements to form oxides except Fluorine. With C&O it forms the bases of nearly all the alkaloids.

Test for Oxygen: It supports combustion.

Oxygen unites with Hydrogen and forms water. Water can be separated into its component parts by electricity. Oxygen unites with Hydrogen and forms Hydrogen Dioxide, which can be made by acting on Barium Dioxide with any dilute acid, thusly, BaO_2 plus 2HCl equals BaCl_2 plus H_2O_2 . A test for Peroxide: It will liberate Iodine from Iodide of Potash in the presence of Ferrous Sulphate.

Ozone Formula, O_3 , molecular weight 48. It is a modified form of Oxygen, that is, three volumes being condensed into two. It exists in the air, especially during a thunder storm. It can be made by passing an electric current through oxygen. It reverts very gradually into oxygen.

A test to distinguish Morphine from Quinine: Nitric Acid produces a red color with Morphine.

Decay is slow oxidation. An impalpable powder is one reduced to such a degree of fineness that it cannot be felt when passed through the fingers.

We have three *Suppository Bases* official: First is Oil of Theobroma, second is Glycerinated Gelatin, and third is Stearate of Soda, which is the vehicle or base in making the official Glycerin Suppositories.

Glycerin Suppositories are made by dissolving Carbonate of Soda in water, add Stearic Acid and Glycerin and heat until effervescence ceases, then pour into molds. The Stearic Acid converts the soda into Stearate of Soda which permits the absorption

of 95% of Glycerin. These suppositories are very Hydroscopic and should be kept in sealed bottles.

The Antidote for Ptomaines: Give emetics, Salol and Opium. The symptoms of this poisoning: They begin about 24 hours after the food has been eaten with nervousness, chilliness, headache, and extreme thirst; pains in the abdomen and calf of the legs and muscles. Muscarine is the poisonous alkaloid in mushrooms, and Tyrotoxin the one found in cheese, milk and ice cream.

A test to find out if Calomel is contaminated with Corrosive Sublimate: Boil the Calomel in water and filter and to the filtration add Hydrogen Sulphide and if a precipitate occurs it indicates Corrosive Sublimate.

LECTURE No. 37

Phosphorous, P., atomic weight 31, valence 3 and 5. It is a non-metallic element made by acting on Calcium Phosphate, which is the chief constituent of bone with Sulphuric Acid, $\text{Ca}_3(\text{PO}_4)_2$ plus $2\text{H}_2\text{SO}_4$ equals 3CaSO_4 plus $2\text{H}_3\text{PO}_4$. The bones are first freed from fat and gelatin and then heated to whiteness, which makes tertiary Calcium Phosphate and this is then treated with Sulphuric Acid and the above equation is proven.

When Phosphorous is exposed to air it emits white fumes and takes fire spontaneously and gives off an odor like that of garlic, and it should be kept under water. It resembles wax in appearance, being a translucent nearly colorless solid. It is insoluble in water but will leave its odor and taste.

Phosphorous can be purified and powdered by melting under water and straining through chamois.

The value of Phosphorous in medicine depends upon its being used in a free state, and all preparations of it must be protected from light and air to prevent oxidation. It is a great reducing agent. Sulphuric Acid is reduced to Hydrogen Sulphide by it.

When we speak of Phosphorous we have reference to the yellow or ordinary P.

Red Phosphorous is made by heating the ordinary Phosphorous

to 300 degrees and is not poisonous, not soluble, seen in powder form, has no fumes. Ignites at 260 degrees, and is seldom used in medicine.

Yellow Phosphorous is very poisonous, being the main ingredient in rat and roach pastes. It is usually seen in stick form. It is soluble in 17 mls. of Chloroform and 400 mls. of Dehydrate Alcohol, and extensively used in medicine. The antidote is old Oil of Turpentine. It forms six acids and two oxides. The most important acid is Phosphoric Acid, H_3PO_4 , also known as Orthophosphoric Acid. It can be made by acting on Bone Ash with Sulphuric Acid. It has two derivatives: Pyrophosphoric Acid, made by heating Phosphoric Acid and depriving it of water. It does not coagulate albumen thus distinguishing it from Metaphosphoric Acid, and it gives a white precipitate with Ammonia and Silver Nitrate test from Phosphoric Acid.

Metaphosphoric Acid, HPO_3 , is often called Glacial Phosphoric Acid. Not U. S. P.

The oxides of Phosphorous are Trioxide, P_2O_3 , and the Penta Oxide, P_2O_5 .

Nitrogen, N, atomic weight 14, valence 3. It is a colorless, odorless and tasteless gas. It is a non-supporter of combustion; a lighted splinter will be extinguished if placed in a jar of Nitrogen. Hydrogen will ignite. Oxygen will not extinguish the flame but intensify it. Nitrogen can be made by heating Ammonium Nitrite (NH_4NO_2 plus heat equals N_2 plus $2\text{H}_2\text{O}$). Nitrogen forms five oxides with oxygen, N_2O , N_2O_2 , N_2O_3 , N_2O_4 and N_2O_5 . The main function of Nitrogen in the air is to reduce down the oxygen.

Nitrogen Monoxide is official. It is known as Laughing Gas. It is made by heating Ammonium Nitrate. It is a colorless gas seen on the market in metal cylinders used in dental surgery, mostly as an anesthetic. Its name, Laughing Gas, is because the patient usually talks and laughs under its influence. The most important combination of Nitrogen is when it unites with Hydrogen and forms Ammonia. Carbon and Nitrogen unite and form

Cyanogen Symbol, CN. It forms salts called Cyanides and unites with Hydrogen and forms HCN.

We have two important acids of Nitrogen: HNO_3 and HN_2 .

The Atmosphere is a mechanical mixture and not a chemical compound. It is composed of 79 volumes of Nitrogen and 21 volumes of Oxygen, other bodies, however, may be or can be present.

The difference between a chemical compound and a mechanical mixture: A mixture possesses all the properties of its ingredients and the ingredients can be mixed in different proportions, but a chemical compound possesses entirely different properties of its ingredients and the proportion is fixed.

A Berry is a pulpy fruit that contains naked seed. Ex., tomato.

To make one ounce of a saturated solution of Iodide of Potash, use 480 grains Iodide of Potash to $5\frac{1}{4}$ drachms of water. The dose is 5 minims.

Cacodylic Acid, not U. S. P. Made by distilling Arsenous Trioxide and Potassium Acetate and oxidizing with Mercuric Oxide. It is chemically Dimethylarsenous Acid. It produces one salt which is official.

Sodii Cacodylas, Cacodylate Soda, 75% pure. It is made by neutralizing the above acid with Sodium Hydroxide. It is used like other Arsenic preparations but less toxic on account of its slow absorption. It is a white powder but usually seen on the market in solution for Hypodermic injection. It is used like 606 or other similar preparations. The dose is 1 to 3 grains; hypo dose, $\frac{1}{2}$ to 2 grains.

Protargol is not official. It is a redish brown powder containing 8% silver in combination with albumen. Used as eye wash and injection.

Argyrol is an Organic Compound composed of 30% silver in combination with Vitellin. It is used in eyes, throat and injection. Vitellin is made from serum albumen by electrolysis.

LECTURE No. 38

Sulphur, S., atomic weight 32, valence 2, 4 and 6. It is found in Italy in the volcanic regions, also found in California, Utah and Louisiana. It exists in a free state. It is a lemon yellow, hard, brittle substance, purified by sublimation.

Brimstone is Crude Sulphur. It is Sulphur mined, melted and poured into molds. It is often called Rolled Sulphur. It is used for technical purposes only.

Sublimed Sulphur is known as Flowers of Sulphur. It is Sulphur purified by sublimation. It has a slight acid taste and reaction. The dose is 60 grains.

Sulphur Lotum is Washed Sulphur, made by macerating Sulphur in water containing Ammonia Water for three days, then strain and wash the Sulphur with water.

Sulphur usually contains small traces of Sulphuric or Sulphurous Acids and the Ammonia forms with it Ammonium Sulphate, which is washed out and thereby removes the Sulphuric Acid. Washed Sulphur is a lemon color powder with no odor or taste and enters into Compound Licorice Powder because when the Sulphuric Acid is washed out it destroys the griping principle.

Precipitated Sulphur is known as Lac. Sulphur, also called Milk of Sulphur. Made by acting on Sulphur and Lime with Hydrochloric Acid and water. It is a very light yellow powder. Dose, 60 grains.

Brimstone, Flowers of Sulphur and Precipitated Sulphur all are the same chemically and all have the same symbol "S."

Sulphur burns with a pale blue flame. It melts at 115 degrees. It unites directly with Oxygen, Chlorine, Phosphorous and Carbon and most of the metals. It is soluble in Carbon Disulphide. Sulphur unites with Hydrogen and forms Hydrogen Sulphide, H_2S , known as Sulphuretted Hydrogen and Hydrosulphuric Acid. It is a colorless gas with an offensive odor used as a re-agent. It unites with many metals and decomposes their oxides and carbonates. It can be made by acting on Ferrous Sulphide with Sulphuric Acid. Sulphur forms with Oxygen four oxides. Sulphur Heptoxide, S_2O_7 , forms with water an acid known as Per-

sulphuric Acid, but it is of little importance. Thiosulphuric Acid is often called Hyposulphurous Acid.

Tellurium is a rare non-metallic element, symbol Te. It is a lustrous white, brittle substance after subliming, but is black before. It is treated very much like Sulphur. Sodium Tellurate is given in night sweats and in the treatment of ulcers of the stomach. Dose, $\frac{1}{2}$ gr. Not official.

The Poison in Face Bleach is Corrosive Sublimate. The poison in Hair Dye is Nitrate of Silver. In Analine Dyes is Arsenic. In Embalming Fluid is Arsenic and Formaldehyde.

LESSON No. 39

Carbon Symbol, C., valence 2 and 4. It occurs in nature in the free state in three allotropic forms, Diamond, Coal and Graphite. It is a constituent in all organic compounds.

Diamond is the rarest form of free carbon. It is the hardest substance known. The weight of Diamond was expressed as karats, but now expressed karat, meaning 200 millegrams.

Graphite, known as Plumbago, or Black Lead, is found in a free state throughout the world. It is used in making lead pencils.

Carbo Animalis is Animal Charcoal. It is an amorphous form of carbon made by heating bone out of contact to air. It is known as Bone-Black, Ivory-Black, and it is used for depriving substances of their color. It is freed from Lime by treating with HCl and washing.

Carbo Ligni is Wood Charcoal. It is tasteless and insoluble. Dose, 15 grains.

Carbon forms two Oxides: Carbon Monoxide and Carbon Dioxide.

Carbon Monoxide, CO, is a poisonous, colorless gas, not used in medicine. It is the poison in illuminating. When inhaled it produces dizziness, headache and convulsions and then death, by preventing the absorption of oxygen. The antidote is fresh air.

Carbon Dioxide, called Carbonic Acid, CO₂, is a colorless, odorless gas with a sharp taste and soluble in its own volume of water.

It will not support combustion and for that reason it is used in fire extinguishers. When it is added to water we get Carbonic Acid Gas or Hydrogen Carbonate, which is an organic Acid that does not exist alone.

Soda Water is a solution of CO_2 gas in water under pressure (H_2CO_3).

Carbonates are salts of Carbonic Acid.

Carbon Disulphide, known as High Life, CS_2 , is made by the direct union of Carbon and Sulphur. It is a poisonous liquid used as a solvent for rubber and sulphur.

Methane, CH_4 , known as Marsh Gas, occurs free in nature and belongs to the Hydrocarbons. It is a colorless, odorless, tasteless gas and burns with a feeble flame. It unites with Chlorine and forms Methyl Chloride, CH_3Cl , from which a series of compounds are formed. Example: When it is acted upon with Silver Oxide, Methyl Alcohol is produced.

Methane can be made by heating a mixture of Acetate of Soda and Caustic Soda.

CHCl_3 is Chloroform, 99% strength, remainder Alcohol which acts as a preservative.

CHBr_3 is Bromoform, used for whooping cough.

Iodoform, called Triiodomethane, CHI_3 , is made by the action of Iodine on Alcohol and an Alkali. It is a lemon yellow powder with a penetrating odor and a sweet taste. It is used as an alterative in 4-grain doses. It is a valuable antiseptic because it contains 97% Iodine.

LECTURE No. 40

Fixed Oils and Fats are obtained from both the Animal and Vegetable Kingdoms. They are greasy to the touch and leave a greasy stain on paper. Chemically, Fixed Oils and Fats are Esters, that is, they contain an alcohol radical and an acid radical.

Fixed Oils are insoluble in and lighter than water. With the exception of Castor Oil and Croton Oil, they are practically insoluble in alcohol. They mix with Chloroform, Petroleum Benzin, and Carbon Disulphide. On exposure to warm air they decom-

pose and acquire a disagreeable odor and taste and are acid to litmus paper. They are then called rancid.

Fixed Oils that become rancid can be purified by treating with hot solutions of Carbonate of Soda.

Vegetable Fixed Oils are usually obtained by expression from fruit and seeds, therefore they are often called "Expressed Oils." They are divided into two classes: Drying and Non-drying. Drying Oils on exposure to air gradually thicken, example, Linseed Oil. The best Non-drying Oil is Olive Oil.

The Chemical Constituents of Fixed Oils and Fats are Olein, Stearin and Palma. *Olein* is the oleate of the triad radical Glyceryl (C_3H_5); it is the liquid principle. *Palmatin* is the solid principle; it is the Glyceride of Palmitic Acid. *Stearin* consists of Glyceryl and Stearic Acid.

Expressed Oil of Almond is a Fixed Oil known as Oil of Sweet Almond, but is obtained from either the Bitter or Sweet Almond. The yield is 40%. It enters into Emulsion of Turpentine and Ointment of Aqua Rosae. Used as a laxative in 1-oz. doses.

Cotton Seed Oil is a Fixed Oil and enters into Camphorated Oil, Soft Soap and Compound Ointment of Tar.

Olive Oil is a Fixed Oil and enters into Lead Plaster.

Linseed Oil is a Fixed Oil and the main constituent is Linolin. It enters into Lime, Liniment and Comp. Solution of Cresol.

Oleum Sesami is a Fixed Oil expressed from the seed of cultivated varieties of *Sesamum Indicum* of the family Pedaliaceae. It is used in Ammonia Liniment because it saponifies readily and is a less sticky mixture.

Castor Oil is a Fixed Oil that is soluble in an equal volume of alcohol.

Glycerin, $C_3H_5(OH)_3$, is called and is official under the name Glycerol. It is called Glyceric Alcohol. It is a triatomic or trihydric alcohol 95% pure. It is obtained by the hydrolysis of vegetable or animal fats, also as a byproduct in the manufacture of soaps. It was first obtained in the manufacture of Lead Plaster. It is a colorless liquid with a neutral reaction and a sweet taste. Sp. G. 1. On account of the fact it absorbs mois-

ture from the air it is used to keep substances moist. The dose of Glycerin is one teaspoonful. When it is acted upon with Nitric Acid we get Nitroglycerin. When it is heated it losses water.

Sapo is Soap, White Castile Soap. It is made by acting on Sodium Hydroxide with Olive Oil. It is a laxative in 2-grain doses. It is a hard soap.

Hard Soaps are made by acting on a Fixed Oil or Fat with Sodium Hydroxide.

Sapo Mollis is Soft Soap, formerly called *Sapo Viridis* or Green Soap. It is made by acting on Potassium Hydroxide with Cotton-seed Oil. It should be a yellow white mass and used externally. If you wish a Green Soap, use Hemp Seed Oil. It enters into Liniment of Soft Soap.

Chemically all Soaps are Oleates. Oleate of Soda is purified Castile Soap, made by dissolving one part of Castile Soap in eight parts of hot water and filter. The filterate contains the Oleate of Soda.

Icthyolum is Ichthyol, chemically it is Ammonium Sulphoichthyolate. It is a tarry-looking substance and contains about 10% of Sulphur. It is prepared from a brownish mineral of animal residue of fossil fishes found in Switzerland. It is given internally in capsules or pills or dissolved in peppermint water, as high as 90 grains daily. Mostly used externally. Sulpho-ichthyolates of Soda, Lithium, and Zinc are on the market. Isarol and Icthyinant are on the market.

LECTURE No. 41

Cinnamomum Cassia is Chinese Cinnamon, and the Volatile Oil obtained from it is official as *Oleum Cassiae* or Oil of Cinnamon. It is the official Oil of Cinnamon, yet there is an Oil of Cinnamon on the market obtained from Ceylon Cinnamon and is a finer variety. It contains 4 to 8% Eugenol and Cassia Oil does not.

There are three varieties of Cinnamon, two official: Ceylon Cinnamon and Saigon, the official ones, the latter being a cultivated variety. True Chinese Cinnamon is not cultivated and seldom reaches American ports.

Ceylon Cinnamon is a very light shade and thin.

Saigon Cinnamon is heavy bark.

The Camphor Tree belongs to the order Lauraceae, species *Cinnamomum Camphora*. The U. S. P. states that Camphor is a keytone obtained from the *Cinnamomum Camphora* and is dextro-rotatory, purified by sublimation.

The chipped wood of the Camphor Tree is distilled with steam and is freed from Volatile Oil by draining and pressing and then subliming.

Dextrotatory has reference to the Polar-iscope, an instrument used in chemical analysis. *Dextrorotatory* is turning the plain of polarization to the right, and *Levorotatory* is to the left.

The Camphor Tree grows abundantly on the Island of Formosa, and island off the coast of China and owned by Japan.

Camphor burns with a smoky flame. It is very soluble in alcohol, almost insoluble in water. The dose is 3 grains used as a stimulant. The liniment is official.

When Camphor is triturated with Menthol, Chloral, Thymol or Thyol, it liquifies.

Monobromated Camphor is official. Made by heating Camphor and Bromine together and treating with benzin and purified by recrystallization. The dose is 2 grains as a nerve sedative.

Camphoric Acid, N. F., made by the oxidation of Camphor, is given in Tuberculosis in 18-grain doses.

Oil of Camphor, N. F., is obtained during the manufacture of Camphor.

Camphor can be prepared artificially by Thurlow process by distilling a mixture of Oxalic Acid, Turpentine and Lime, but it is optical inactive.

Camphor Menthol and *Camphor Chloral* are both in the N. F. Used externally for pain.

White Mustard Seed does not yield the Volatile Oil of Mustard.

Petrolatum, called Petroleum Jelly, also *Pertolatum Ointment*. It is a mixture of solid Hydrocarbons obtained from Petroleum. It is about the same as Vaseline. It enters into Ointment of Mercury Dilute and Ointment of Yellow Oxide of Mercury. It is an

ointment like mass, varying in color from yellowish to light amber.

Petrolatum Album is White Petrolatum or White Petroleum Jelly. It is the same as White Vaseline. It is Petrolatum decolorized by passing through Animal Charcoal.

Liquid Petrolatum, called Liquid Paraffin or Mineral Oil, also known as Russian Oil, sold for a number of years as Liquid Alboline, is a mixture of Liquid Hydrocarbons obtained from Petroleum. It is a colorless liquid, SP. G. 830 to 900. It is soluble in Ether, Chloroform and Petroleum Benzin. It is insoluble in alcohol or water. It readily dissolves Camphor, Menthol or Thymol and forms what are known as nasal sprays with them. It is given internally in $\frac{1}{2}$ -oz. doses and is said to be an intestinal lubricant and in that way causes the bowels to move.

Heavy Liquid Petrolatum should have a viscosity of 3.1, and the Light not less than 3. Viscosity of more or less adhesion of the molecules of a liquid have to each other so that they flow with difficulty.

LECTURE No. 42

It is the time required for a given amount of a substance to flow to a given space compared to that of water.

The degree of thickness of all Petroleum products is due to the amount of paraffin they contain.

Paraffinum is Paraffin. It is a mixture of Solid Hydrocarbons obtained from Petroleum. It is often called Paraffin Wax because it resembles wax in appearance. It is used in making ointments and enters into Ointment of Boric Acid.

Beninum Purificatum is Purified Petroleum Benzin. It is often called Petroleum Ether. It is a purified distillate from American Petroleum and consists chiefly of Hydrocarbons from the marsh gas series. It is highly inflammable and its vapor when mixed with air and ignited will explode. The crude product is Gasoline, often called Benzine.

Petroleum not official. It is as its name indicates, *Petra* (Rock) *Oleum* (Oil), Rock Oil or Mineral Oil. It is a mixture of Liquid Hydrocarbons found in the earth in various parts of the world.

Its source is uncertain, but it is believed to be obtained from fossilized animal residue.

Marsh Gas is the first member of the Hydrocarbon series and occurs free in nature wherever vegetable matter is undergoing decomposition.

LECTURE No. 43

The Alkaline Metals are Potassium, Sodium, Lithium and Ammonium. They all have the valence 1.

All combine with acids to form salts and all turn red litmus paper blue. All of their carbonates are soluble in water.

The above are the main characteristics of the Alkaline Metals.

Kalium, Symbol K, is Potassium, atomic weight 39, valence 1. The element Potassium, which is often spoken of as the Metal Potassium, was first obtained from Potassium Hydroxide by Electrolysis. A small amount can be obtained from sheep's wool. The largest supply was obtained from the salt mines of Germany, where it was found as the impure Chloride.

Potassium Hydroxide, KOH, known as Caustic Potash, also as Potassium Hydrate. It is a powerful alkali. It is seen on the market in sticks about the size of a pencil, white and deliquescent, and should be kept in well closed bottles. When it is dissolved in water it produces intense heat. It is made most extensively by acting on Calcium Hydroxide and Potassium Carbonate. K_2CO_3 plus $Ca(OH)_2$ equals $2KOH$ plus $CaCO_3$. It is 85% pure. Used in Solution Potassium Hydroxide.

Liquor Potassii Hydroxidi, Solution of Potassium Hydroxide. It is an aqueous solution containing not less than 4.5% Potassium Hydroxide. It is made by dissolving Potassium Hydroxide in distilled water. The dose is 15 minims. The antidote is vinegar or weak acids.

Potassii Acetas, Potassium Acetate, $KC_2H_3O_2$. It is often called Sal Diuretic. It is a very deliquescent salt and should be kept in airtight containers. It is made by acting on Bicarbonate of Potash with Acetic Acid. $KHCO_3$ plus $HC_2H_3O_2$ equals

$\text{KC}_2\text{H}_3\text{O}_2$ plus CO_2 plus H_2O . But the Carbonate of Potash is almost exclusively used because it is a cheaper product.

Potassii Bicarbonas, Potassium Bicarbonate, KHCO_3 . It is 99% pure. It is often called Sal Aeratus. It yields large quantities of CO_2 gas. It is used in Solution of Citrate of Magnesia and Liq. *Potassii Arsenitis*. The dose is 15 to 30 grains. K_2C_3 plus CO_2 plus H_2O equals 2KHCO_3 .

Potassii Carbonas, Carbonate of Potash, called Salts of Tartar. It contains 15% moisture. Formula K_2CO_3 . Very deliquescent. Dose, 15 grains. Large doses irritant.

Potassii Chloras, Potassium Chlorate, KClO_3 . It is a colorless crystal, almost insoluble in alcohol. One gramme will dissolve in $11\frac{1}{2}$ mls. of water. It is soluble in glycerin. Care should be exercised in heating or placing under strong pressure with organic substances, as sugar or Tannic Acid, Sulphur or other oxidizable substances, as it will explode. During the war a license or permit was required to buy or sell it in large quantities. Made by acting Calcium Chlorate with Potassium Chloride. $\text{Ca}(\text{ClO}_3)_2$ plus 2KCl equals 2KClO_3 plus CaCl_2 .

Potassa Sulphurata, Sulphurated Potassa, called Liver of Sulphur. It is new in the U. S. P. It is made by mixing one part of Sulphur with two parts of Carbonate of Potash and heating together. It enters into Lotio Alba of the N. F. It is used in skin diseases, externally.

Cyanide of Potash, KCN , is very poisonous. Dose, $\frac{1}{5}$ grain.

Liquor Potassii Citratis, Solution of Potassium Citrate, often called Neutral Mixture. Made by dissolving Bicarbonate of Potash in water and dissolving Citric Acid in water and mixing the two solutions. It should always be made fresh. It is used as a refrigerant in tablespoonful doses.

Potassii et Sodii Tartras, Potassium and Sodium Tartrate, known as Rochelle Salts, $\text{KNaC}_4\text{H}_4\text{O}_6$. It is made by acting on Cream of Tartar with Carbonate of Soda. Dose, 150 grains. It enters into Seidlitz Powder.

Potassii Bitartras, Potassium Bitartrate, known as Cream of Tartar. Its source is from Argols. The U. S. P. limits the amount

of impurities (lead) to 20 parts to one million, which is the limit in all impurities of food products of the U. S. P. It is classed as a food product. It enters into Comp. Jalap Powder (*Pulvis Purgans*) and as a refrigerant and purgative in 30-grain doses. Also used in the manufacture of Tartaric Acid.

Potassii Iodidum, *Kali Iodidi*, is Iodide of Potash. It is white crystal, very soluble in water, slightly soluble in alcohol (1 to 22). It is used as an alterative in 5-grain doses. During the manufacture of this salt there is developed a poisonous substance called Iodate of Potash and this is removed by treating with Charcoal. They always use a little Carbonate of Potash in the manufacture to whiten it.

Potassii Nitrates, Nitrate of Potash, called Saltpetre, also called Nitre, KNO_3 . The dose is 8 grains. It is produced artificially in Nitre beds which are composed of wood ashes and animal and vegetable refuse. These are protected from rain and in time the ammonia in the organic matter oxidizes and forms Nitric Acid, which unites with the Potassium Hydroxide in the wood ashes and gradually forms Nitrate of Potash. It is used in making gunpowder and the same requirements as Chlorate of Potash applied to it during the war. (KOH plus HNO_3 equals KNO_3 plus H_2O .)

Potassii Permanganas, Potassium Permanganate, KMnO_4 , known as Violet Potash. It is a powerful oxidizing agent and when brought in contact with organic matter gives off oxygen. It is a dark purple crystal soluble in water but decomposed by alcohol. It is used as an antidote in Opium poisoning in 4-grain doses, and in strong solutions injected into snake bites. The average dose internally is one grain.

Potassii Hypophosphis, Potassium Hypophosphite, is official for making Syrup Hypophosphites and as a preservative in Dilute Hydriodic Acid. It is an explosive and should not be triturated with nitrates. It can be given in 8-grain doses internally.

Potassii Citras Effervescens is Effervescent Potassium Citrate. It is made like all effervescent salts. Dose 30 to 60 grains.

A test for Potassium Salts: a colorless flame is tinted violet.

LECTURE No. 44

Ammonium, NH_4 , molecular weight 18, valence 1. The metal has never been isolated and the nearest thing we have to it is the Amalgam, which is a metallic, spongy-like mass. When Ammonium Chloride in contact with Mercury is brought in contact with an electric current a butter-like mass is formed which is the Ammonium Amalgam. (Amalgam is a compound that one of its constituents must be Mercury.)

A test for Ammonium Salts: When heated with a solution of Potassium Hydroxide the odor of ammonia is developed.

NH_3 is *Ammonia Gas*, and when we add it to water we get Ammonia Water, which is Ammonium Hydroxide, official as *Aqua Ammoniae Fortior*, or strong Ammonia Water. It is 28% strength and never given internally.

NH_4OH is Solution of Ammonium Hydroxide or Ammonia Water. It is 10% strength and the dose is 15 minims. It is often called Spirit of Hartshorn.

The Source of Ammonia Salts is from the gas liquor of coke ovens or the native carbonate found in guano deposits of S. A.

When fumes of HCl come in contact with Ammonia we have Ammonium Chloride.

Ammonium Chloride, NH_4Cl , known as Muriate of Ammonia. Made by acting on Ammonia Gas with Hydrochloric Acid, then evaporate to dryness in iron pots. The impurity that is liable to be in Ammonium Chloride is the Ferrous Carbonate, which comes from the iron pots it is made in.

Sal Ammoniac is commercial Muriate of Ammonia.

Ammonium Carbonate is not a normal carbonate but a mixture of Acid Ammonium, Carbonate and Carbamate. In order to convert the Carbamate dissolve it in a little water and ammonia water. It is sometime called Baker's Ammonia because it is used in making bread. It contains 31% of Ammonia Gas and should be kept in well closed containers and only the hard translucent pieces should be used. On exposure to air it loses its CO_2 gas.

Smelling Salts is made by placing some Ammonium Carbonate in a bottle and adding Ammonia Water and perfume.

When any Iodide assumes a dark color, it indicates that free Iodine is present and it should not be dispensed. Iodide of Ammonia can be deprived of its free Iodine by treating with a solution of Ammonium Sulphide. This is the only Iodide that can be.

Ammonium Iodide, NH_4I , is a white power given in 5-grain doses. It is very deliquescent and gives up Iodine easily. It should not be dispensed if dark.

Lithium Li, atomic weight 7. It is the lightest of all known metals. It is found in large quantities but distributed in all three kingdoms. It is a constituent of some mineral waters. We have the Bromide, Carbonate and Citrate official. The dose of each is 8 grains as a diuretic.

Natrium, Na, is Sodium, atomic weight 22.88. It is found as the Chloride. The element which is often called Metal Sodium can be made by the electrolysis of NaOH .

Sodium Hydroxide, NaOH . called Caustic Soda, also Sodium Hydrate. It is very deliquescent, seen in white sticks. When it is added to water it produces great heat.

Solution of Sodium Hydroxide is 4.5% strength. Made by adding NaOH to water. It enters into Magma Magnesia.

We have four *Salts of Sodium* that are poisonous: Sodium Aresnate, Dried Sodium Arsenate, Cacodylate of Soda, and Cyanide of Soda. All official.

Sodii Benzosulphonidum is Sodium Saccharin, called Soluble Saccharin. Made by neutralizing Benzoic Acid Saccharin. It is not as sweet but more soluble.

Sodii Glycerophosphas, Sodium Glycerinophosphate. It is a white powder having a saline taste. Made by neutralizing Glycerophosphoric Acid with Carbonate of Soda.

Glycerophosphoric Acid is made by heating Glycerin and Phosphoric Acid together. It is 20% strength.

Sodium Perborate is a white salt that contains not less than 9% of Available Oxygen. It is made from Boric Acid and Sodium Peroxide. It is used as an antiseptic dressing and bleaching

agent. Its value depends on the amount of Available Oxygen.

Sodii Phenolsulphonas is the same as Sulphocarbolated Soda. It is used as an antiferment in 4 to 20 grain doses, usually given in enteric capsules.

Sodii Benzoas is a white powder given in 15-grain doses.

Sodii Bicarbonas, NaHCO_3 is known as cooking soda. It is soluble in water but insoluble in alcohol. It is made by passing CO_2 Gas into Solution of Carbonate of Soda. When it has a little alkaline taste it is due to a small amount of carbonate present. This can be removed by washing. When it is heated it loses its water and gas and is converted into Carbonate of Soda. The dose is 15 grains, best in carbonated water.

Sodii Salicylas, $\text{NaC}_7\text{H}_5\text{O}_3$, is made by acting on Carbonate of Soda with Salicylic Acid. Is very soluble in water used in rheumatic conditions. Dose, 15 grains.

Sodii Carbonas Monohydratus, Na_2CO_3 plus H_2O . It is known as Sal Soda or Washing Soda. It is the source of most of the salts of Soda. It is made by three different methods: LeBlanc, Solvae, and Cryolite. The latter, which is a mineral found in Greenland, is mostly used in this country. It is a white efflorescent crystal or white powder. The dried carbonate is the one given internally.

Sodii Bromidum, NaBr . It is given in 15-grain doses. It contains more Bromine than Bromide of Potash. It is considered inferior to Potash but is more used.

LECTURE No. 45

Sodii Boras, *Sodium Borate*, $\text{Na}_2\text{B}_4\text{O}_7$, Sodium Bimorate or Tetraborate, called Borax or Tincal. It is found in Death Valley, also mined as Calcium Borate, which can be converted into Borax by treating with Sodium Carbonate. It is used in mouth washes and in the house as a cleanser and enters into Ointment Aqua Rosae as a bleaching agent. The dose is 10 grains.

Sodii Hypophosphis, *Sodium Hypophosphite*, NaH_2PO_2 . Made from Calcium Hypophosphite and Sodium Carbonate. It is used in medicine in nervous and wasting diseases in 15 grain doses.

It is a reducing agent and should not be prescribed with Mercury or Silver Salts.

Sodii Indigotindisulphonas, called Indigo Carmine and Ceruleine. Made by adding a Sodium Salt to Indigo Sulphate. It is official for coloring Bichloride of Mercury Tablets, as it is claimed to be more lasting. It is also used for tests of Nitrates and Chlorine.

Sodii Nitris, Sodium Nitrite, NaNO_2 , is made by adding strips of sheet lead to Nitrate of Soda and heating for several hours, cooling, washing and crystalizing. Lead Oxide is formed at the same time. NaNO_3 plus Pb equals NaNO_2 plus PbO. This salt is official for the sole purpose of preparing Sweet Spirits of Nitre.

Sweet Spirits of Nitre is made by acting on Sodiu Nitrite with Alcohol Water and Sulphuric Acid and distill. The distillate is Ethyl Nitrite. Then add enough Alcohol to make the mixture weigh 22 times the weight of the Ethyl Nitrite. The dose is 1 dr. That you buy called Conc. Nitrous Ether is Ethyl Nitrite.

Sweet Spirits of Nitre is a pale yellowish liquid and should have a neutral reaction. It should not effervesce when a crystal of Bicarbonate of Potash is dropped into it. It can be kept neutral by keeping a crystal of Bicarb. Potash in the bottom of the bottle. The acidity that is developed is due to the formation of an Aldehyde that is converted into an acid.

In filling prescriptions with preparations containing Tannin, such as FE Buchu should not be put in bottle until effervescence ceases, caused by Tannin decomposing Ethyl Nitrite and liberating Oxides of Nitrogen. Antipyrine forms with it a green precipitate called isonitrosoantipyrine, supposed poison.

Sodii Chloridum is Chloride of Soda or table salt. It is mined as rock salt or obtained from brine wells. It is used in hemorrhages. Dose, 4 dr. NaCl .

NaClO_3 is *Chlorate of Soda*. It is soluble in one part of water and has that advantage over Chlorate of Potash.

Sodii Sulphas, known as Glauber's Salt, called Horse Salt, is used as a purgative for animals. It is obtained as a byproduct in the manufacture of HCl .

Sodii Iodidi is used like Iodide of Potash. Dose is 8 grains.

Sodii Phosphas, Na_2HPO_4 . It is an acid salt with an alkaline reaction. It is chemically Disodiumorthophosphate. It is very soluble in water. Dose, 1 dr. It is often contaminated with arsenic. Dried Phosphate of Soda is official for preparing Eff. Phosphate of Soda.

Sodium Thiosulphate, formerly called Hyposulphite of Soda, called by the photographers Hypo., is used for Poison Ivy.

Sodii Arsenas is Arsenate of Soda and is preferred to Arsenous Acid as it is more uniform in quality. Made from Arsenous Trioxide, Nitrate of Soda and Carbonate of Soda. The dried Arsenate of Soda enters into Liquor Sodii Arseantis. The dose is $\frac{1}{20}$ gr.

LECTURE No. 46

The Alkaline Earths are Magnesium, Calcium, Barium and Strontium.

Magnesium is found as Magnesite, a carbonate; Dolomite, a double Magnesium, and Calcium Carbonate; Kieserite, a Sulphate and in the form of Silicates such as Meerschaum, Talc and Asbestos. The symbol is Mg., the valence is 2.

The Element Magnesium is a silver white metal and can be obtained by heating Magnesium Chloride with the Metal Potassium in a platinum crucible and washing out the Potassium Chloride that is formed. On account of its chemical activity it is used in flashlight powder. It burns readily with a white very bright light. It contains large quantities of Hydrogen Gas and Carbon Monoxid. We have two oxides of Magnesia official: the light and heavy.

Magnesi Oxidum, Magnesium Oxide, called Magnesia, Calcined Magnesia, and Light Magnesia. Made by heating Magnesium Carbonate to a red heat. This is made from the Light Magnesium Carbonate. It is used as a laxative and antacid in 30 gr. It is a light white powder often called Magnesium Ustum. MgCO_3 plus heat equals MgO plus CO_2 .

Magnesi Oxidum Ponderosum is heavy Oxide of Magnesia.

Made by heating the heavy Magnesium Carbonate to dryness. It is used like the Light and there is no chemical difference between the two, but when one part of Light Magnesia Oxide is mixed with 15 parts of water and let stand for half an hour a gelatinous mass is forced; the Heavy will not.

The official Magnesium Carbonate is not a normal salt but a mixture of MgCO_3 and Magnesium Hydroxide. Commercially it is prepared from Dolomite and also by treating the Sulphate with Sodium Carbonate and water. Cold water makes the Light Carbonate and hot water the Heavy. Carbonate of Magnesia is seen on the market in ounce or two ounce blocks. It is very light and white and the dose is 30 to 60 grains. It was once used in the manufacture of medicated waters but was found to be slightly soluble and would impart a slight acid reaction to them. It is an antacid and in the presence of acids it is cathartic.

Magnesium Sulphate, MgSO_4 plus $7\text{H}_2\text{O}$. It is prepared in this country from Magnesite by acting on it with Sulphuric Acid. MgCO_3 plus H_2SO_4 equals MgSO_4 plus H_2O plus CO_2 . It is soluble in one to one of water and almost insoluble in alcohol. It is given as a cathartic in $\frac{1}{2}$ -oz. doses and if given in ice water the nauseous bitter taste is not so noticeable. It is a white, odorless needle-like crystal. If a few grains of Epsom Salts is injected into the veins it acts as a deadly poison.

A Test to distinguish Epsom Salts from Zinc Sulphate: Zinc Sulphate will precipitate in a solution of Ferrocyanide of Potash, Epsom Salts will not.

Magma Magnesia, known as Milk of Magnesia and Lac Magnesia. Made by mixing Magnesium Carbonate in distilled water, dissolving Sodium Hydroxide in distilled water, mixing the two solutions with constant stirring for $\frac{1}{4}$ hour. Then wash the resulting Magma well by decantion until the red color produced in 50 mls. of the washing by 3 minims of Phenolphthalein T. S. is discharged by one drop of Dilute Sulphuric Acid. It should contain $7\frac{1}{2}\%$ Magnesium Hydroxide. It is used as an antacid and laxative. The dose is 2 to 3 drachms. The U. S. P. permits its use in the official Arsenic Antidote.

Carbonization is a process of heating organic substances without access to air until all volatile principles are driven off. Charcoal is made in this way.

When a salt is added to water and heat is produced, it is due to a chemical change.

Andydrous Salts are those free from water; when they are added to water, heat is produced by it taking up two or three molecules of water. Ex., Iodide of Soda.

When salt is added to water and cold is produced, it is due to a physical change. Ex., Iodide of Potash.

Calcination is the process of separating volatile substances from inorganic matter by the aid of heat. Ex., Calcined Magnesia is made this way.

LECTURE No. 47

Santonin should be kept in amber-colored bottles away from light.

Solution Potassium Hydroxide should be kept in bottles with rubber stoppers or glass stoppers covered with paraffin.

Lime Water should be kept with undissolved lime in the bottom of the bottle.

Peroxide Hydrogen should be kept in bottles with paraffin covered stoppers or remove the cork and place a piece of cotton over it.

Chloride of Zinc should be kept in glass-stoppered bottles covered with paraffin as it is very hygroscopic.

Powdered Squills should be kept in sealed bottles.

An Alloy is a mixture of two or more metals usually produced artificially by fusion, although some are found native.

Gold Coin is an alloy of 900 parts gold, 75 parts copper and 25 parts silver.

Brass is an alloy of copper, zinc and a little tin.

Amalgams are alloys which must contain mercury as one of the constituents, and some Amalgams are liquid.

Cobalt, Co., atomic weight 59. It is a grayish metallic element usually found associated with Arsenic as Smaltite Cobalt Arsen-

ide. It is often called Fly Stone. Cobaltus Chloride is used for making the test solution.

Cuprum is Copper, Cu., atomic weight 63.57. It is found in the metallic state and mined in the United States. It forms two oxides: Cuprous Oxide and Cupric Oxide, but it has but one salt official: Cupri Sulphas, Copper Sulphate or Cupric Sulphate. It is made by acting on Copper with Sulphuric Acid. It is a mineral astringent in $\frac{1}{4}$ -gr. doses and a mineral emetic in 4-gr. doses. It is commonly known as Blue Stone or Blue Vitriol. Oleate of Copper is used for ringworms.

A solution of Copper Sulphate 1 in 20 has a blue color and is acid to litmus.

Plumbum is Lead, Pb., atomic weight 207, valence 2. It is found as the Sulphide called Galena. It is often found associated with Silver. The metal is a lustrous blueish gray element soft enough to cut with a knife. If exposed to moist air it oxidizes and in this way people have been poisoned by it in drinking water.

Soft Water is a solvent for lead, hard water is not.

Lead forms five oxides and only one is official, *Plumbi Oxidum*, PbO. It is a very heavy yellow powder used in making Lead Plaster. It is almost insoluble in water and alcohol. Soluble in Acetic Acid, Dilute Nitric Acid and KOH Sol. It is known as Litharge. Massicot is the impure form.

Red Lead is a higher oxide of lead. It is in the N. F.

Lead Iodide is not U. S. P.; was given in $\frac{1}{2}$ -gr. doses.

Lead Carbonate is not U. S. P. Known as Flake White and White Lead.

Plumbi Acetas, Pb (C₂H₃O₂)₂, known as Sugar of Lead. It is a colorless crystal and efflorescent absorbing Co₂ on exposure to air. It is a mineral astringent given in 1-gr. doses. When it is dissolved in water it becomes cloudy, due to the formation of a trace of Carbonite. This can be cleared by the addition of a few drops of Acetic Acid.

Stribium, Sb, valence 3 and 5, atomic weight 120. It is Antimony. It is a brittle white metal found as the Sulphide which is known as Gray Antimony Ore or Black Antimony Powder. Sul-

phurated Antimony is known as Kermes Mineral on account of its orange red color. It enters into Plommer's Pills, N. F.

The Trichloride of Antimony is known as Butter of Antimony, which is used as a bronzing solution.

Antimony and Potassium Tartrate is the only official salt of Antimony, $K(SbO)C_4H_4O_6$. Made by acting on Cream of Tartar with Oxide of Antimony. It is an expectorant in 1/12 gr. doses, and emetic in 1-gr. doses. It is soluble in water and insoluble in alcohol. It is known as Tartar Emetic and enters into Comp. Syrup of Squills and Brown's Mixture. Wine of Antimony was dropped by the last U. S. P. The test for Antimony and Arsenic is Marshes test.

Marshes Test: If a solution containing either Arsenic or Antimony be placed in a flask containing Zinc and Sulphuric Acid is added and the Hydrogen Gas, which is evolved on ignition, will deposit a ring of metallic lustre on a porcelain plate, it shows the presence of either Arsenic or Antimony. If the spot on the plate is Antimony it will dissolve in a solution of Ammonium Sulphide. If it is Arsenic it will not.

Incompatibility is the term used to express the effects produced in Pharmaceutical mixtures, by chemical decomposition, physical dissaciation, and therapeutical opposition.

<i>Rx</i>	Zinc Sulph	gr. x	This is a chemical incompatibility, a new compound being formed. Sulphate of Lead, which falls to the bottom and Acetate of Zinc, which remains in solution. Dispense with a shake label.
	Plumbi Acet.	gr. xv	
	Aqua qs.	oz. iv	
	Msig: As directed		

<i>Rx</i>	Quinine Sulph.	gr. l	This is a physical incompatibility, as the acid acts on the Ammonia in the Licorice and destroys the sweet principle, making the solution very bitter, whereas the Dr. intended a sweet mixture. Dispense with a shake label.
	Acid Sulph. Arom.	dr. ii	
	F. E. Licorice	dr. iv	
	Aqua	oz. i	
	Syrupus qs. add	oz. iv	
Msig: dr. i, q. 4 hrs.			

R Morphine Sulph. gr. ii This is an intentional therapeutic incompatibility as these drugs
 Atropine Sulph. gr. $\frac{1}{4}$ act directly opposite to each
 Aqua qs. add oz. ii other, but that is the Physician's
 Msig: 2 drops pr. H. desire.

The Harrison Narcotic Law. It affects Opium and its preparations, which contain more than a specified amount of Opium or its derivatives.

Coca Leaves, their preparations and derivatives. The prop. or firm must register with Internal Revenue Collector, and the firm is given a serial number and special blanks for ordering all narcotics on. These blanks must be in duplicate and kept in file for two years and open to inspection by the Government. No prescription can be dispensed unless original, and it must contain the name and address of the patient and the full name and address of the M. D. with his serial number. This prescription cannot be refilled and must be kept for two years open to inspection of the Government. Preparations containing not more than the following are exempt: Opium, 2 gr. to the ounce; Codeine, 1 gr. to the ounce; Morphine, $\frac{1}{4}$ gr. to the ounce; Heroin $\frac{1}{8}$ gr. to the ounce. This has reference to solids as well as liquids. Cocaine cannot be dispensed in any amount or in any way except on prescriptions. Dover's Powder, Smith's Glyco Heroin, and Sun Cholera Mixture cannot be dispensed except on prescriptions.

LECTURE No. 48

Silicon, Si, valence 4, atomic weight. Next to oxygen it is the most abundant element. It is not found in a free state but in combination with oxygen as the dioxide known as Pumice Stone. *Purified Silicious Earth* is official.

Argentum, Ag, atomic weight 107, valence 1. It is found in the metallic state usually in combination with lead as the sulphide.

The Antidote for Silver Salts is Sodium Chloride.

Argenti Oxidum, Ag₂O, Silver Oxide. It is a heavy black powder given in 1-grain doses. Care should be exercised in handling

it as it parts with its oxygen very rapidly and to avoid explosion should not be brought in contact with oxidizable substances. It must never be brought in contact with Ammonia. It is used as a substitute for Silver Nitrate for internal administration, as it is less caustic.

Argenti Nitras, AgNO_3 , Silver Nitrate. Dose is $\frac{1}{6}$ grain. Externally escharotic. Internally it is used in gastritis and diarrhoea. It is a colorless crystal becoming grayish black on exposure to light and air.

All Silver Salts should be kept in amber-colored bottles protected from light and air.

Argenti Nitras Fusus is molded Nitrate of Silver, or Fused Nitrate of Silver, known as Luna Costic. Made by adding Hydrochloric Acid to melted Nitrate of Silver and pouring into molds. The HCl is added to toughen it so it will not break.

Mitigated Nitrate of Silver, N. O. It is a diluted Nitrate of Silver made by melting Nitrate of Silver and Nitrate of Potash together. It is used externally.

Arsenic, As, valence 3 and 5. It is a metallic element found as the sulphide. It is a steel-gray color and forms two oxides: Arsenic Trioxide and Pentaoxide. It forms three compounds with Sulphur: First is the Disulphide, which is known as Realgar; second is Orpiment or the Trisulphide, and the third is Penta-sulphide.

Arsenic Trioxide, As_2O_3 , called Arsenous Acid, Arsenous Anhydride and White Arsenic. Dose is $\frac{1}{30}$ grain. Used as an alterative. Its antidote is the only official antidote. It is made by roasting Arsenic Ores in furnaces. It can be converted into Arsenous Acid by adding to water.

Anhydride means acid without water. We have two trioxides called acids: Arsenic Trioxide and Chromium Trioxide. Any Trioxide may be converted into an acid by adding to water.

Arsenii Iodidum is Arsenous Iodide, AsI_3 , called Iodide of Arsenic. It is 99% pure. It can be made in three ways: First, by heating one part of Arsenic Trioxide with 5 parts of Iodine; second, by dissolving them together in Chloroform and exaporat-

ing the Chloroform by heat; third, by pouring a solution of Arsenous Trioxide into HCl and pouring that into a solution of Potassium Iodide and collecting the precipitate. The dose is 1/12 grain, and enters into Donovan's Solution.

Turpentine Emulsion: Rectified Oil of Turpentine, oz. i; Exp. Oil of Almond, m. 192; Acacia, dr. viii; Aqua qs., oz. viii. Place your Acacia in a clean, dry bottle of suitable capacity and add the Turpentine and expressed Oil of Almond, shaking thoroughly, then add 2¾ ounces of water and shake vigorously. When the oil has been completely emulsified add syrup in several proportions, shaking after each addition, then add water qs. in small proportions, shaking after each addition.

LECTURE No. 49

Bismuth, symbol Bi. It is trivalent. It is a brilliant metal with a silver color and a reddish tint. It is often contaminated with Arsenic which can be removed with Hydrogen Sulphide. It is soluble in Nitric Acid and when it is dissolved in Nitric Acid and evaporated to dryness Bismuth Nitrate is formed and from this the most of the Bismuth Salts are formed. They are called Sub. Salts.

Bismuth Subnitrate, Formula BiOnO_3 . It is a pearl white powder, odorless and tasteless. It has a slight acid reaction. People have been known to be poisoned from Bismuth due to the contamination of Arsenic.

If you should have a prescription to fill containing Bismuth and Bicarbonate of Soda, you should use Glycerite of Starch if they are to be massed and put in capsules, as it contains no water.

Bismuth Subcarbonate is a basic subcarbonate of Bismuth used as an astringent and tonic and is preferred for pills or capsules, as it is not so acid. It is a white powder given in 8-grain doses.

Bismuth Subgallate, known as Dermatol. It is used internally as a sedative and astringent, but more frequently used externally as a skin remedy. It is used as a substitute for Iodoform and preferred on account of no odor. The dose is 8 grains.

All Bismuth Salts are insoluble in water, except Bismuth and Ammonium Citrate, which is seen in scale form. It is made by heating a solution of Bismuth Citrate with Ammonia Water. The dose is 3 grains. If solutions of Bismuth Citrate are cloudy they can be cleared up with a little Ammonia Water.

Magma Bismuth, called Milk of Bismuth, also Cream of Bismuth, is made by dissolving Bismuth Subnitrate in Nitric Acid and water, dissolve Ammonium Carbonate in water and Ammonia Water, mix the two solutions, wash the precipitate and add distilled water. The dose is one drachm used as a substitute for Bismuth S. N.

Bismuth Subsalicylate is a white powder used as an intestinal antiseptic. Dose, 5 to 15 grains.

Calcium, Ca, valence 2, is found in nature as chalk and marble.

Calx is Calcium Oxide, called Quicklime, made by calcining Limestone, which is Calcium Carbonate. It is usually the base for depillatory powders.

Depillatory Powders are those used to remove superfluous hair.

Liquor Calcis is Solution of Calcium Hydroxide. It has an alkaline taste and absorbs CO₂ Gas from the air. It is used in checking nausea and used in infants' food.

Lotio Nigra is Black Wash, called Aqua Phagedoenica Nigra. It is made by adding 55 grains of Calomel to $\frac{1}{2}$ oz. water, then add lime water qs. to a pint.

Lotio Flava is Yellow Wash, called Aqua Phagedoenica Flava. It is made by adding $22\frac{1}{2}$ grains Corrosive Sublimate to $\frac{1}{2}$ oz. hot water, then adding lime water qs. to one pint. The yellow precipitate is Yellow Oxide of Mercury. The black precipitate in Black Wash is Black Oxide of Mercury.

When Calomel is added to lime water it turns black, when Corrosive Sublimate is added to lime water it turns yellow, and this is the test you should give if called on to distinguish between the two.

Precipitated Calcium Carbonate is Precipitated Chalk, CaCO₃. It is an odorless, tasteless, white powder used largely in the manufacture of face powders and tooth powders. It is chemically

identical with prepared chalk but does not possess the adhesive qualities, therefore inferior in making chalk powders.

Cretae Preparatae is Prepared Chalk. It is Calcium Carbonate purified by elutriation. It is known as Drop Chalk or Crab's Eye. It enters into Mercury with Chalk, Chalk Mixture in the form of Chalk Powder. It is used in these powders on account of its adhesiveness.

Exsiccated Calcium Sulphate, known as Gypsum, is Plaster of Paris, N. O.

Whiting is commercial Prepared Chalk, N. O.

Calx Chlorinatae is Chlorinated Lime.

Calcium Bromide is a white granular salt, odorless and tasteless, with a saline taste. It is used as a hypnotic and sedative in 15-grain doses.

Calcium Chloride is sometimes given internally as a haemostatic in 5-grain doses.

Calcium Glycerophosphate is official. Dose, 5 to 10 grains.

Calcium Hypophosphite is official. Dose, 5 grains.

Calcium Lactate is official. Used to control hemorrhages, also in chronic ulcers of the stomach. Dose, 5 to 10 grains.

Crude Calcium Sulphide was called *Calx Sulphuretta*. It is made from Calcium Sulphate, Charcoal and Starch. It is used externally as a depillatory and in $\frac{1}{2}$ -grain doses internally for acne.

A Test for Cottonseed Oil and Olive Oil: If Olive Oil is shaken in an equal amount of Nitric Acid and allowed to stand for six hours it should be a light yellow color. If a dark brown color, it indicates Cottonseed Oil or other impurities.

Velminck's Solution is a solution of Sulphurated Lime, N. F. Used externally in skin troubles.

Coconut Oil is Oleum Cocos. It is a Fixed Oil from *Cocos Nucifera*.

Acetylsalicylic Acid is Aspirin, given in 5-grain doses. It is incompatible in solution with alkalies. When given with Quinine internally in solution it has been known to produce the Quinotoxin.

Acidum Phonylcinchoninicum is Phonylcinchonic Acid, known as Atophan. It is an organic acid made from Benzaldehyde and Anniline. It is seen in colorless needles or white or yellowish white powder with a slight odor of Benzoic Acid. It is insoluble in cold alcohol or water, soluble in hot alcohol. Dose, 8 grains.

Aluminum, symbol Al, valence 3. It is a metal found in combination Silicic Acid in rock and clay. Some of the fine stones, such as Sapphires and Rubies, are an aluminum oxide.

Alumini Hydroxidum, Aluminum Hydroxide, $Al(OH)_3$. It is U. S. P. as a dusting powder. Made by dissolving separately Alum and Monohydrated Carbonate of Soda in water, heat the solutions and mix while hot and collect the precipitate. It is used like Zinc Oxide.

Alumen is Alum. It is made from Alum Plate, which is Aluminum Silicate, which contains Iron Pyrites, which on calcination forms Sulphuric Acid, which combines with the Aluminum and forms Aluminum Sulphate and then Potassium Sulphate or Ammonium Sulphate is added and forms Aluminum and Ammonium Sulphate or Aluminum and Potassium Sulphate, which is Alum. Either one is recognized by the U. S. P., but the one generally sold is the Ammonia Alum. It is a double salt. Used as an astringent in 8-grain doses. The Ammonia Alum is less soluble than the Potash Alum. Potassium Alum is soluble in 7.2 mils. of water.

Alumen Exsiccatum is Exsiccated Alum, called Alumen Ustum, Dried Alum and Burnt Alum. It is made by heating Alum to dryness. One hundred gms. of Alum yields about 55 gms. The label should show which Alum it is made from. It is used as an escharotic and is more powerful than Alum and less soluble.

Manganese, symbol Mn., valence 2-4-6. It is found as the black oxide. It is a gray, lustrous metal, very hard and brittle. It forms five compounds with oxygen but only one is official, that is below.

Mangani Dioxidum Praecipitatum, Precipitated Manganese Dioxide, MnO_2 . It is known as Black Oxide of Manganese. It

is a heavy, very fine black powder without odor or taste. Dose, 4 grains. Used as a haemetic. It is insoluble.

Manganese Sulphate, not U. S. P., known as Pink Vitriol. Used as a Chologogue Cathartic. Dose, 5 grains. MnSO_4 .

Potassium Permanganate, KMnO_4 , is considered as a salt of Manganese. It is known as Condy's Crystals or Red Manganate of Potash.

Chromium, symbol Cr., valence 2 and 6. It is found in nature as Chromite, FeOCr_2O_3 , which is Chrome iron ore in Pa. It forms five oxides and one is U. S. P. (below).

Chromii Trioxidum, *Chromium Trioxide*, known as Chromic Acid. Chromic Anhydride, CrO_3 . It is made by decomposing Potassium Dichromate with Sulphuric Acid. It is very poisonous, never used internally, used mostly as a caustic to remove warts. It should never be brought in contact with organic substances as it is explosive.

Aurum-Gold, symbol Au, valence 1 and 3. It is found in the free state but in small quantities. There is one U. S. P. salt (below).

Auri et Sodii Chloridum, Gold and Sodium Chloride. It contains not less than 30% of metallic gold. It is an orange yellow powder, odorless with a saline taste. Dose, $1/12$ grain, as an alterative.

LECTURE No. 50

Some Solubilities in Water: Boric Acid, 18 parts; Alum, 8 parts; Ammonium Chloride, very soluble; Blue Stone, very soluble; Epsom Salts, 1 part; Camphor and Menthol, slightly soluble; Salol, insoluble; Lead Acetate, soluble in 2 parts; Tannic Acid, very soluble.

Herbs are plants whose stems do not become woody and die to the ground after flowering. Ex., Peppermint.

Decolorized Tincture of Iodine is not a tincture, it is a solution of Sodium and Ammonium Iodide, made by digesting Iodine with Thiosulphate of Soda with Alcohol and Ammonia Water.

Ethereal Oil is a mixture of Esters and contains Ether, Alcohol, Sulphuric Acid and water. Enters into Hoffman's Anodyne.

The Iodine number or value of fats indicates the number of grains of Iodine a fat or oil will absorb under specified conditions.

The difference between Saponification and Emulsification: In the first the oil is converted into a soluble soap, and in the latter the oil is suspended in water by the aid of a gum or mucilage.

Passiflora Incarnatta is May Pop, also known as Passion Flower. Not U. S. P.

A Test for Silver Salts: Hydrochloric Acid produces a white precipitate.

A Test for Magnesium Salts: Alkalies produce a white precipitate.

Extracts are solid or semi-solid products prepared by exhausting the drug with a solvent and evaporating to the proper consistency. When the Extracts are made by exhausting the drug with water, they are called Aqueous Extracts. Example: Gentian, Opium and Malt.

Powdered Extracts are made by evaporating down the liquid and rubbing up with dried starch or Magnesium Oxide to keep in powder form. They are preferred to Solid Extracts because they can be handled more easily.

Solid Extracts are kept in a pilular consistency with a little glucose.

In making Extract of Aconite, Tartaric Acid is used to develop up the Alkaloid. It should contain 2% of the Ether Soluble Alkaloids. Dose, 1/6 grain.

Compound Extract Colocynth contains Ext. Colocynth, Aloes, Cardamon Seed, and Resin Scammony and Dried Soap. Enters into C. C. Pills. Dose, 4 grains.

Extract Nux Vomica was 5% Alkaloids and it is now 16%. Dose, 1/4 grain.

Extract of Opium should contain 20% Morphine, made by percolating the Opium with water, evaporating down and rubbing up with starch. Dose, 1/2 grain.

Extract Glycyrrhizae Purum is Pure Extract of Licorice. It

contains Ammonia Water to develop up the sweet principle. Enters into Brown's Mixture.

Extract of Glycyrrhiza is the commercial Extract of Licorice, seen in rolls. It enters into Troches of Ammonium Chloride and Troches of Cubeb.

Some important drugs added to the U. S. P.: Scammony Root, Asphidosperma, Petroselina, Heroin, Cotarnine, Nitrogen Monoxide, Phenolphthaelin, Emetine Hydrochloride, and the two Magmas.

Some drugs that were dropped: Phytolacca Decandra (Poke Root) Berberis, Calamus, Cocoa and Witch Hazel.

The following drugs are subject to insect attacks: Cantharides, Ginger, Rhubarb, Ergot and Flaxseed. These insects are mites and can be destroyed or prevented by the addition of a few drops of Chloroform or Carbon Tetra-Chloride, from time to time.

LECTURE No. 51

Ferrum, Iron, symol Fe, valence 2 and 6. It is found as the oxide. It forms two classes of compounds—ous and ic. The U. S. P. states that Ferrum is metallic iron, Fe. atomic weight 55, in the form of fine, bright wire.

Ous is the low form of Iron, valence 2; *Ic* is the high form of Iron, valence 6.

To convert a ferrous salt into an ic salt, use Nitric Acid, and to convert an ic into ous use Hydrogen Sulphide.

A Test for Iron Salts: Potassium Ferrocyanide produces a deep blue color with the ous salts and a green color with ic salts.

Ferrum Reductum, called Reduced Iron, Iron by Hydrogen, and Quenvenne's Iron. It is Iron reduced to the metallic state by the action of Hydrogen on Ferric Oxide. Symbol, Fe, atomic weight 55, and is 90% pure. It is an insoluble, very fine, grayish-black powder, permanent in the air. The dose is one grain.

Sugar is added to a number of iron preparations to prevent the ous iron from being converted into ic iron.

Massa Ferri Carbonatis is Mass of Ferrous Carbonate, known as Vallet's Mass. Should contain not less than 35% Ferrous Car-

bonate (FeCO_3). Made by pouring a solution of Ferrous Sulphate into a solution of Monohydrated Carbonate of Soda, add syrup, collect the precipitate and mix with honey and sugar and evaporate down to a pilular state. Dose, 4 grains.

Ferri Chloridum, Ferric Chloride, Iron Perchloride or Sesquichloride of Iron. It is made by evaporating a solution of Chloride of Iron. It is seen in orange yellow crystalline pieces. It is used externally as a styptic and internally as a tonic. Dose, 1 to 5 grs.

Ferrous Salts are usually green in color, and *Ferric Salts* are brown.

Ferri et Ammonii Citras, Iron and Ammonium Citrate, Soluble Ferric Citrate. It is Ferric Citrate rendered more soluble by the addition of Ammonium Citrate. It occurs in transparent garnet red scales and is soluble in water, insoluble in alcohol.

Ferri et Quininae Citras, Iron and Quinine Citrate, was called Iron and Quinine Citrate Soluble in U. S. P. 8. It contains 11.5% Anhydrous Quinine and 13% Iron. Made by dissolving Citrate of Iron in water by the aid of a little heat, and dissolve Quinine and Citric Acid in water. Mix the two solutions and add Ammonia Water and evaporate to a syrupy liquid. Spread on glass so as to obtain in scale form. It is an Iron Salt that contains an Alkaloid. It is made soluble by the addition.

The Salts of Iron is made soluble by the addition of an Alkaline Citrate, such as Citrate of Ammonia.

Ferri Phosphas, Ferric Phosphate, is a soluble salt of iron, made so by the addition of Sodium Citrate. Dose of last of these is 4 grains.

Ferri Sulphas, Ferrous Sulphate, called Iron Protosulphate, the impure known as Copperas or Green Vitriol, FeSO_4 . It is a greenish crystal and on exposure to air it oxidizes and is coated with a brownish yellow which is basic Ferric Sulphate. It is a powerful iron astringent. Copperas is used as a disinfectant. The dose of the C. P. is $1\frac{1}{2}$ grains. It is used for making the two following salts. Insoluble in alcohol.

Ferri Sulphas Exsiccatus, Exsiccated Ferrous Sulphate, Dried Ferrous Sulphate. One hundred gms. of Ferrous Sulphate yields

about 65 grains. It is a grayish white powder, slowly soluble in water. Dose, 1 grain.

Ferri Sulphas Granulatus, Granulated Ferrous Sulphate, called Precipitated Ferrous Sulphate. Made by dissolving Ferrous Sulphate in boiling water, add Dil. Sulphuric Acid, then evaporate, filter and pour alcohol over it and spread on bibulous paper and dry at room temperature. It is a pale blueish green crystalline powder. Dose, $1\frac{1}{2}$ grains. It is used for making Blaud's Pills.

Ferri Carbonas Saccharatus, Saccharated Ferrous Carbonate. It is made from Ferrous Sulphate, Sodium Bicarbonate, Dilute Sulphuric Acid, water, sugar and sugar of milk. It is a greenish brown powder slightly soluble in water, made more soluble by the addition of HCl. Dose, 4 grains, as a tonic.

Iron Rust is Hydrated Ferric Oxide.

Ferric Hydroxide, N. F., $\text{Fe}(\text{OH})_3$. It is made by adding a solution of Ferric Sulphate to Ammonia Water and collecting the precipitate. It is used as an Arsenic Antidote, but is not the official one. The official one is *Ferri Hydroxidum Cum Magnesi Oxido*—Ferric Hydroxide with Magnesium Oxide. Dose, 4 fluid ounces.

Zincum, symbol Zn, valence 2, atomic weight 65. It is found as the impure Carbonate, called Calamine, and the element can be obtained by roasting. Prepared Calamine is in the N. F. The element is a blueish white metal seen in thin sheets. It is dissolved by Dilute Sulphuric or Hydrochloric Acid with an evolution of Hydrogen.

Zinci Chloridum, ZnCl_2 , is a very deliquescent salt, very caustic and should not be tasted. Used externally as an antiseptic and disinfectant. Very soluble.

Zinci Oxidum, ZnO , is a very heavy powder, used mostly externally. Ointment U. S. P. It is insoluble in water or alcohol. Internal dose, 1 grain.

Zinci Phenolsulphonas, Zinc Phenolsulphonate, called Sulphocarbolate Zinc. $\text{Zn}(\text{C}_6\text{H}_5\text{O}.\text{SO}_3)_2$. It is seen in white crystals. used as an antiseptic and given internally in 2-grain doses. Soluble in 1.6 mls. water. It is acid to litmus.

Zinci Stearas, Zinc Stearate, is a compound of Zinc with Stearic Acid and small amount of Palmitic Acid. Contains 13% Zinc Oxide. It is made from Acetate Zinc. Used as a dusting powder.

Zinci Acetas, $\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2$, seen in soft white six-sided monoclinic plates. Soluble in 2 mils. of water. Dose, 2 grains.

Precipitated Carbonate of Zinc is U. S. P. Fine white powder without odor or taste.

Zinci Sulphas, ZnSO_4 , known as White Vitriol, is the most common salt of Zinc. Seen in white crystals or crystalline powder: It is used as an astringent in one grain doses. Prompt emetic in 15-grain doses.

Zinci Valeras is Zinc Valerianate, $\text{Zn}(\text{C}_5\text{H}_9\text{O}_2)_2$. Seen in pearly white scales or powder. Used as nervine and antispasmodic. Dose, 1 to 3 grains. It is one of the instances of upward precipitation. Made from Sodium Valerate and Zinc Sulphate. It is soluble in 22 mils. alcohol and 70 mils. water.

LECTURE No. 52

Hydrargyrum, symbol Hg, atomic weight 200, Sp. G. 13.5. It is Mercury, known as Quicksilver. It is found in Spain and California. Found as the Sulphide, called Cinnabar, and it is only necessary to heat this ore and obtain the element in a free state. It is a shining, silver-white metal; liquid at ordinary temperature and freezes at 40 degrees C., below zero.

Mercury is used in the metallic state in medicine more than any other element. The following preparations are made direct from the element: Mercurial Ointment, Diluted Mercurial Ointment, Mercury with Chalk, and Mass of Mercury.

Mercury is prepared for medical use by straining through chamois skin. It is poisonous but when taken in one-pound doses it passes through the body without ill effects.

A Test for Mercury Salts: Iodide of Potash produces a green precipitate with Mercurous Salts, and a red precipitate with Mercuric Salts.

Mercury forms two classes of compounds: Ous and Ic. The valence of "ous" compound is 1 and "ic" 2.

When Cold Nitric Acid is added to Mercury we get Mercurous Nitrate and when Hot Nitric Acid is added we get Mercuric Nitrate.

Hydrargyri Iodidum Flavum is Yellow Mercurous Iodide, called Protoiodide of Mercury. Green Iodide of Mercury, Yellow Iodide of Mercury, HgI . On exposure to light it becomes greenish as it undergoes decomposition. It is a bright yellow powder used as an alterative in 1/6 grain doses. Made by dissolving Mercury in Nitric Acid and adding a solution of Iodide of Potash and collecting the precipitate.

Hydrargyri Iodidum Rubrum, Red Mercuric Iodide, called Binioidide of Mercury. It is a scarlet red powder, odorless and permanent in the air. The formula is HgI_2 . It is made by adding a solution of Corrosive Sublimate to a Solution of Iodide of Potash and collecting the precipitate. It is used as an alterative in 1/20 grain doses. Externally it is a vesicant.

Both the above salts are almost insoluble in water and insoluble in alcohol.

Hydrargyri Oxidum Flavum is Yellow Mercuric Oxide, HgO . It is an orange-yellow powder used externally and enters into Oleate of Mercury and Ointment of Yellow Oxide of Mercury. It is made by pouring a solution of Corrosive Sublimate into a solution of Sodium Hydroxide and collecting the precipitate.

Hydrargyri Oxidum Rubrum is Red Mercuric Oxide, HgO , called Red Precipitate. It is an orange-red crystalline powder, made by heating Mercuric Nitrate until it ceases to give off red fumes and washing with alcohol and water. Used to destroy vermin, and externally for skin diseases.

We have two Iodides of Mercury: Yellow Mercurous Iodide and Red Mercuric Iodide.

We have two Oxides of Mercury: Yellow Oxide of Mercury and Red Oxide of Mercury, both "ic" salts and both HgO .

We have two Chlorides of Mercury: Mercurous Chloride Mild, HgCl , and Corrosive Mercuric Chloride, HgCl_2 .

Hydrargyrum Cum Creta, Mercury with Chalk, called Gray Powder. Made by shaking Mercury, clarified honey and water in a bottle until the Mercury is invisible under a magnifying glass magnifying 4 diameters, than add Prepared Chalk and mix thoroughly. This simply reduces the Mercury to minute globules. It is of a light gray color and should be free from grittiness. It should be protected from light and air as on exposure it develops into a higher salt of Mercury. The dose is 4 grains. Mostly given to children.

Hydrargyrum Ammoniatum, Ammoniated Mercury, called White Precipitate, HgNH_2Cl . Made by pouring a solution of Ammonia Water into a solution of Corrosive Sublimate. It is a poisonous white powder, on exposure gradually turning yellow and changing into a higher salt. The Ointment is U. S. P. and is 10% strength.

Hydrargyri Chloridum Corrosivum is Corrosive Mercuric Chloride, HgCl_2 , called Bichloride of Mercury, Corrosive Sublimate, and Perchloride of Mercury. It is 99.5% pure. It is very poisonous and the sale of it should be recorded in a Poison Register. It is soluble in 13 parts of water and 2 parts of boiling water, and very soluble in alcohol. It can be made more soluble by the addition of a Chloride. It is used internally as an alterative in $1/20$ grain doses. Used externally as an antiseptic. It is made by heating Mercury with Sulphuric Acid, adding Sodium Chloride and subliming. It is seen as coarse crystals or white powder, odorless and a characteristic taste.

Hydrargyri Chloridum Mite is Mild Mercurous Chloride, called Calomel, Subchloride of Mercury and Protochloride of Mercury, also Submuriate of Mercury. It is a white impalpable powder and becoming yellowish-white under strong pressure. It is insoluble in water, alcohol or ether or cold dilute acids. It should be kept protected from light and air, as it will decompose. It should not be dispensed with Alkalies or Alkaline Salts as it would be converted into higher salt of Mercury. It is used as an alterative in $1/4$ -grain doses, and as a laxative in $2\frac{1}{2}$ -grain doses. It is made from Mercury, Sulphuric Acid and Sodium Chloride. Take part

of the Mercury and heat with the Sulphuric Acid, this forms Mercuric Sulphate, then rub up with the remainder of the Mercury, which forms Mercurous Sulphate, then add Sodium Chloride and sublime.

Hydrargyri Salicylas, Mercuric Salicylate. It is a white, slightly yellowish or pinkish powder, made from Corrosive Sublimate, Sodium Hydroxide, and Salicylic Acid. It should contain not less than 54% Metallic Mercury. Average dose, 1/15 grain. It is insoluble in water or alcohol. It is used hypodermically by mixing with Quinine and Urea, Distilled Water, Anhydrous Wool Fat and Liquid Petrolatum.

IMPORTANT VEGETABLE DRUGS

Official name: *Podophyllum*; Common name: May Apple—Mandrake; Pharmacopeial definition: Rhizome and roots of *Podophyllum Peltatum* (botanical name); Natural order or family: *Berberdaceae*; Habitat: North America; Medical properties: Cathartic; Active Constituent: Resin; Dose: 3 grs.; U. S. Preparations: Fluid Extract, Resin.

Official name: *Cambogia*; Common name: Gamboge—Pipe Gamboga; Pharmacopeial definition: Gum-resin obtained from *Garcinia Hanburii* (botanical name); Natural order or family: *Guttiferae*; Habitat: Siam; Medical properties: Hydrogue cathartic; Active constituent: Resin; Dose: 2 grs.; U. S. Preparations: Enters into C. C. Pills.

Official name: *Oleum Theobromatis*; Common name: Oil of *Theobroma*, Cacao Butter; Pharmacopeial definition: A concrete fixed oil obtained from the roasted seed of *Theobroma Cacao* (botanical name); Natural order or family: *Sterculiaceae*; Habitat: Mexico; Medical properties: Used in making suppositories; Active constituent: Palmatin.

The botanical name of a drug, often called the botanical origin, is the name recognized by the botanist (usually the last two names in the definition).

The habitat is where it was first found in the wild state.

Fixed oils and fats consist of three principles: Olein, the liquid, and Palmatin and Stearin, the solids.

Chocolate contains an alkaloid which is identical with caffeine. It is called Theobromine. Theobromine-Sodio Salicylate is the same as Diuretin and is U. S. P.

Geranium is Cranesbill of the N. O. Geranacea. Used as an astringent in 15-grain doses. It contains Tannin. Not U. S. P.

Comp. Cathartic Pills contain Calomel, Ext. Colocynth, Co. Powd. Camboge and Resin of Jalap.

Podophyllum is a perennial plant with a straight stem and one white flower, growing in moist woods of N. A.

The *Gamboge* tree grows to about 40 feet in height, large, smooth leaves and small flowers and clustered fruit. The resin flows as a thick viscid yellow liquid from the tree when cut and becomes hard on exposure. It contains 70% resin and 20% gum. It comes to the market in rolls or pipes or solid cylinders.

Gambogic Acid is a bright yellow color and used by painters to lacure brass. It has no odor but an acrid taste.

Theobroma Cacao, the Chocolate Tree, name from the Greek word meaning "Food for the Gods." It grows about 16 to 20 feet and one cultivated tree can yield about 15 pounds of cured coco. The fruit is 6 to 8 inches in length, the rind thick and watery, pulp sweet, and the seed are the cacao beans of commerce.

Official name: *Serpentaria*; Common name: Texas Snakeroot—Virginia Snakeroot; Pharmacopeial definition: The dried rhizome and roots of *Aristolochia Reticulata* (T) ae, and *Aristolochia Serpentaria* (V); Natural order or family: *Aristolochiaceae*; Habitat: United States; Medical properties: Stimulant; Active constituent: Volatile Oil; Dose, 15 grs.; U. S. P. Preparations: Enters into Tr. Cinchona Co.

Official name: *Nux Vomica*; Common name: Dog Button—Quaker Button—Poison Nut; Pharmacopeial definition: The dried ripe seeds of *Strychnos Nux Vomica*, yielding not less than 2.5% of the alkaloids of *Nux Vomica*; Natural order or family: *Loganiaceae*; Habitat: India; Medical properties: Tonic; Active constituents: Strychnine, Brucine; Dose: 1 gr.; U. S. P. Preparations: Tincture Ext. and Fluid Ext.

Official name: *Gelsemium*; Common name: Yellow Jasmine—Yellow Jessamine; Pharmacopeial definition: The dried rhizome and roots of *Gelsemium Sempervirens*; Natural order or family: *Loganiaceae*; Habitat: Southern United States; Medical properties: Nerve Sedative; Active constituent: *Gelsemine*—*Gelseminine*; Dose, ½ gr.; U. S. P. Preparations: Ext., Fluid Extract and Tincture.

Official name: *Spigelia*; Common name: Pinkroot, Carolina

Pink; Pharmacopeial definition: The dried rhizome and roots of *Spigelia Marilandica*; Natural order or family: *Loganiaceae*; Habitat: U. S.; Medical properties: Anthelmintic; Active constituents: Alkaloid, Spigeline and Volatile Oil; Dose: 60 grs.; U. S. P. Preparations: Fluid Extract.

Aristolaceae is derived from the Greek word meaning favoring childbirth.

Serpentaria is a small herbaceous plant growing in rich shady woods, has purple flowers growing from joints near the roots. It is an emmenagogue, expectorant, tonic and diuretic. In small doses it promotes appetite and digestion. It is chiefly used as a stimulant in combination.

Nux Vomica is a native tree of Ceylon, E. I., of modest size. The fruit is about the size of an orange with brittle shell with several seeds in a pulpy fruit, very poisonous. Thirty grains of *Nux Vomica* have produced death in half hour; half grain Strychnine in 14 minutes. The antidote is Tannin, which forms an insoluble tannate.

Nux Vomica is chiefly employed as a tonic and stimulant for the heart and nervous system. It is good in Tr. form for habitual cough caused by nervousness, sick headache, one minim doses every 15 minutes.

Brucine acts exactly like Strychnine except it is absorbed more slowly. The dose of Brucine is $\frac{1}{10}$ to $\frac{1}{3}$ grain.

Strychnine produces tetanic spasms. The average dose is $\frac{1}{40}$ grain; can be given as high as $\frac{1}{6}$ if gradually increased. It acts as an aphrodisiac, good for the sight caused by excessive alcohol or tobacco use.

Gelsemium is a climbing plant of the forest of the South. It has bright yellow flowers and forms festoons from one tree to another. It is a heart depressant and should not be used with a weak heart. It is used for spinal meningitis, delirium tremens, sleeplessness, after-pains and ovarian neuralgia. It has the property of calming the mental capacity where there is constant dread, such as a woman about to become a mother or students preparing for a final examination. It is considered good in sciatica. It con-

tains two alkaloids, Gelsemine and Gelseminine, the latter an amorphous, highly poisonous substance. The maximum dose is 2 grs. The antidote is Carbonate of Ammonia or Arom. Spts. Ammonia and Morphine.

Spigelia was named for Adrin Vonder Spigel, a Belgian physician. It is a perennial herbaceous plant with large, showy, scarlet flowers. It is used as an anthelmintic in combination with Senna. In large doses it is a dangerous cathartic, often producing vertigo, dimness of vision and dilated pupils, spasms and convulsions; therefore it is best prescribed in combination with a purgative.

Spigeline is a toxic alkaloid.

Spigelia Anthelmia is Worm Grass. Not U. S. P. Was used as cardiac affections caused from rheumatism.

Official name: *Cardamomi Semen*; Common name: Cardamom Seed—Cardamon Seed; Pharmacopeial definition: The dried seeds of *Elettaria Cardamomum*; Natural order or family: *Zingiberaceae*; Habitat: India; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 15 grs.

Official name: *Zingiber*; Common name: Ginger; Pharmacopeial definition: The dried rhizomes of *Zingiber Officinale*; Natural order or family: *Zingiberaceae*; Habitat: Africa; Medical properties: Stimulant; Active constituents: Oil and resin; Dose: 15 grs.; U. S. P. Preparations: Resin, Tr., Fluid Extract.

Official name: *Benzoinum*; Common name: Benzoin; Pharmacopeial definition: Balsamic Resin from *Styrax Benzoin*; Natural order or family: *Zingiberaceae*; Habitat: Siam; Medical properties: Stimulant; Active constituent: Benzoic Acid; Dose, 15 grs.; U. S. P. Preparations: Tr. Co., Tr. Lar.

Official name: *Ergota*; Common name: Ergot—Secale Cornutum—Spurred Rye; Pharmacopeial definition: The dried *Sclerotium* of *Claviceps-purpurea*, replacing the grain of rye; Natural order or family: *Hypocreaceae*; Habitat: Europe; Medical properties: Echolic Parturient; Active constituent: Ergotinine, Ergotoxine; Dose: 30 grs.; U. S. P. Preparations: Ext. and Fluid Ext.

A Sclerotium is a hard, compact substance of fungi.

Cardamon Seed should be removed from the capsules. They contain 4.5% Volatile Oil. They are used in Aromatic Powder and F. E. They destroy griping of other drugs. In Asia they are used as a food. Name means spice plant.

Benzoin is obtained from a tree native to Sumatra and Siam. The first comes to the market in blocks or lumps varying in size. Siam Benzoin is in pebble-like tiers and yellowish to rusty brown externally. It has a vanilla-like taste.

Tincture of Benzoin is used in face preparations. Compound Tincture, known as Frier's Balsam, is used as an inhalation.

Benzoic Acid is an organic acid made from Benzoin, also prepared from Toluol, a coal-tar product. It can be made from cattle urin. It is used for rendering alkaline urin acid, also stimulating the vesical mucous membrane. Benzoic Acid enters into Paregoric. The dose is 8 grains.

Jamaica Ginger is rhizomes with the corky layer removed. It is often made white by steeping in a solution of Precipitated Chalk.

African Ginger, known as Race Ginger, is placed in boiling water before drying.

Dr. Hardman's Ginger Beer—1½ ounces ginger, 1 ounce cream of tartar, 1½ ounces sugar, mixed and placed in earthen jar with gallon of boiling water; when cool add 4 ounces of yeast, cover with blanket and let stand in a warm place over night. Strain and bottle in well-stoppered bottles for three days.

The active constituents of Ergot are Ergotoxin, Ergotinine, Tyramine and Histamine. Tyramine resembles Epinephrine. Ergotoxin can be converted into Ergotinine by the abstraction of one molecule of water. Histamine lowers blood pressure.

Official name: *Cascara Sagrada*; Common name: *Rhamnus Purshiana*, Chittem Bark, Sacred Bark; Pharmacopeial definition: The dried bark *Rhamnus Purshiana*; Natural order or family: *Rhamnaceae*; Habitat: United States; Medical properties: Cathartic; Active constituents: Contains Emodin and Frangulic Acid; Dose, 15 grs.; U. S. P. Preparations: Ext.—F. E. and Arom. F. E.

Official name: *Frangula*; Common name: Buckthorn Bark; Pharmacopeial definition: The dried bark of *Rhamnus Frangula*; Natural order or family: *Rhamnaceae*; Habitat: Europe; Medical properties: Cathartic; U. S. P. Preparations: Fluid Extracts.

Official name: *Lycopodium*; Common name: Vegetable Sulphur, Club Moss; Pharmacopeial definition: The spores of *Lycopodium Clavatum*; Natural order or family: *Lycopodiaceae*; Habitat: Europe; Medical properties: 47% Fixed Oil.

The family *Rhamnaceae* contains about ninety species, which are mostly shrubs or low trees.

Cascara grows in California to a height of 15 to 20 feet with leaves 3 to 5 inches in length, with white flowers after leaves mature. During the process of drying the Frangulic Acid and Cascarin split up and form Emodin (CHO). The powder is colored dark orange by Ammonia.

Frangula is a tree-like small shrub, known as berry-bearing Alder, as it bears small black berries, and they are used to dye wool green and yellow when unripe, and blue, gray and emerald when ripe. The flowers are very small. The powdered bark is a light yellowish brown and colors the saliva yellow. Powdered *Frangula* turns a deep red with Ammonia.

Important.—The above barks should be kept for one year before using, as this makes them more definite in strength and destroys the griping principle. *Frangula* is milder in its action than *Cascara*. Magnesium Oxide is used in making the Arom. Fluid Extract to destroy the bitter principle.

Lycopodaceae is the Club Moss family and the species are indigenous to dry woods, rocks and hill tops. It is claimed by homeopathics to be an active drug when triturated with sugar of milk. Used for dyspepsia and even diphtheria.

Official name: *Colocynthis*; Common name: Bitter Apple; Pharmacopeial definition: The dried pulp of the fruit *Citrullus Colocynthis*; Natural order or family: *Cucurbitaceae*; Habitat: Asia; Medical properties: Hyd. Cath.; Active constituent: *Colocynthin*; U. S. P. Preparations: Ext., Comp. Ext.

Official name: *Elaterinum*; Common name: *Elaterin*; Pharma-

copeial definition: A principle obtained from *Elaterium*, a substance deposited by the juice of the fruit *Ecballium Elaterium*; Natural order or family: *Cucurbitaceae*; Habitat: Europe; Medical properties: Drast. Cath., used for the trituration; Dose: 1/20 grain.

Official name: *Pepo*; Common name: Pumpkin Seed; Pharmacopeial definition: The dried ripe seed of the cultivated varieties of *Cucurbita Pepo*; Natural order or family: *Cucurbitaceae*; Habitat: Asia; Medical properties: *Taenifuge*; Active constituents: Oil, Resin; Dose: 1 oz.

Notes.—*Cucurbitaceae* is the gourd family. *Colocynth* is also known as Bitter Cucumber and Vine of Sodom. The plant is closely allied to the cucumber. It grows mostly in Turkey, Africa and Spain, the latter being the main source for commerce. The fruit resembles that of an orange in size and color, but a very hard rind, which is removed and the pulp then dried. The seed are bland and are used for food in Africa.

Elat'erin is a neutral principle obtained from the juice of the wild or Squirting Cucumber, which is a fruit about 1½ inches long growing on an herbaceous vine. The juice exudes from around the seed and is very thick mucous with a sediment; in this is the Elaterin, which is obtained by treating with Chloroform and then precipitating with Ether. It is a very drastic cathartic and cardiac depressant and should be given with care.

Official name: *Lobelia*; Common name Indian Tobacco; Pharmacopeial definition: Dried leaves and flowering tops of *Lobelia Inflata*; Natural order or family: *Lobeliaceae*; Habitat: United States; Medical properties: Expct.; Active constituent: Lobeline; Dose: 2½ grs.; U. S. P. Preparations: Tr. F. E.

Notes.—*Libelia* is a weed having pale green leaves and pale blue flowers. It is also known as Asthma Weed as it is an anti-spasmodic. An infusion of the leaves as a local application for poison oak. It was named for Mathew Lobel, who was the physician to James I of England. It was introduced into Europe in 1829. Lobeline is a liquid alkaloid.

Official name: *Rheum*; Common name: Rhubarb; Pharmaco-

peial definition: The rhizomes and roots of *Rheum Officinale*, deprived of most of its bark tissues, grown in China and Thibet, dried and preserved by a few drops of Chloroform from time to time; Natural order or family: *Polygonaceae*; Habitat: Asia; Medical properties: Cathartic, Astringent; Active constituents: Chrysophan, C. Acid, Tannic Acid, Emodin; Dose: 15 grs.; U. S. P. Preparations: Ext., F. E., Tr. Arom. Tr.; Pill and Powder are U. S. P.

Notes.—*Polygonaceae* is known as the Buckwheat family. The Rhubarb grown in the United States has no cathartic effect. *Chrysophan*, *Emodin* are the cathartic principles of Rhubarb. When it is roasted it loses its cathartic effects but retains its astringent properties. It is then called Torified Rhubarb. If powdered Rhubarb is adulterated with Powder Turmeric, a solution of Boric Acid will turn it brown.

Official name: *Guarana*; Common name: *Guarana*; Pharmacopeial definition: A dried paste of the crushed seed of *Paullinia Cupana*, yielding 4% Caffeine; Natural order or family: *Sapindaceae*; Habitat: S. A.; Medical properties: Stimulant; Active constituent: Caffeine; Dose: 30 grs.; U. S. P. Preparations: F. E. Official.

Official name: *Triticum*; Common name: Couch Grass, Dog Grass; Pharmacopeial definition: Rhizome and roots of *Agropyron Repens*; Natural order or family: *Gramineae*; Habitat: United States; Medical properties: Diuretic; Active constituent: Triticin; Dose: 60 grs.; U. S. P. Preparations: F. E.

Official name: *Amylum*; Common name: Starch, Corn Starch; Pharmacopeial definition: The starch separated from the grain *Zea Mays*; Natural order or family: *Gramineae*; Habitat: United States; Medical properties: Absorbent; U. S. P. Preparation: Glycerite.

Official name: *Saccharum*; Common name: Sugar, Sucrose; Pharmacopeial definition: Sucrose ($C_{12}H_{22}O_{11}$), obtained from cultivated varieties of *Saccharum Officinarum* and *Beta Vulgaris*.

Zea is corn silk, the styles and stigmas of *Zea Mays*. It is not U. S. P. but Fluid Extract is used as a diuretic.

Beta Vulgaris is the beet, and the sugar beet is a form of the common beet and the cultivation greatly increases the percentage of sugar.

Official name: *Myristica*; Common name: Nutmeg; Pharmacopeial definition: The kernels of the ripe seed of *Myristica Fragrans*; Natural order or family: *Myristicaceae*; Habitat: E. I.; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 8 grs.

The *Arilli*, which is the fleshy covering of the nutmeg, is known as Mace. It was U. S. P. but not now. It yields a fixed oil by expression known as Mace Butter.

Official name: *Calumba*; Common name: *Columba*, *Columbo*; Pharmacopeial definition: The dried root of *Jateorhiza Palmata*; Natural order or family: *Menispermaceae*; Habitat: Africa; Medical properties: Bitter Tonic (no Tannin); Active constituent: Columbin; Dose: 30 grs.; U. S. P. Preparation: Tr.

We have three bitter tonics which contain no Tannin. They are *Calumba*, *Gentian*, and *Quassa*.

Pareira, known as *Pareira Brava*, is the roots of *Chondrodendron Tomentosum* and belongs to the above order but it is not U. S. P. Used as diuretic and laxative.

Official name: *Sanguinaria*; Common name: Blood Root; Pharmacopeial definition: Rhizome and roots of *Sanguinaria Canadensis*; Natural order or family: *Papaveraceae*; Habitat: N. A.; Medical properties: Alterative; Active constituent: Sanguinarine; Dose: 2 grains; U. S. P. Preparation: Tr.

Sanguinarine is a colorless alkaloid but yields red salts.

Official name: *Opium*; Common name: *Opium*, *Thebiacum Meconin*; Pharmacopeial definition: The air-dried, milky exudation obtained by incising the unripe capsules of *Papaver Somniferum*, and yielding in its normal, moist condition not less than 9.5% Anhydrous Morphine; Natural order or family: *Papaveraceae*; Habitat: Asia; Medical properties: Anodyne, Narcotic, Hypnotic; Active constituents: Morphine, Codeine, Narcotine, Thebaine; Dose: 1 gr.

Opium is official in four forms: Powdered, Deodorized, Granu-

lated and in flattened masses. Deodorized Opium is made from Powdered Opium by macerating and percolating with purified Petroleum Benzin, which removes the narcotine and odorous principles.

Paregoric and Dover's Powders are both made with Powdered Opium.

Tincture of Opium (Laudanum) and Tincture Opium Deodorized are made from Granulated Opium.

Extract of Opium is made from Opium cut in small pieces, macerated and percolated with water, evaporated to dryness and mixed with starch.

Opium contains twenty-one alkaloids, but owes its value to the narcotic alkaloids, Morphine and Codeine.

Narcotine is not a narcotic, but is said to be anti-periodic.

Thebaine is a powerful convulsant, exalting the spinal cord like Strychnine.

Cotarnine is prepared from Narcotine and is a powerful styptic and hemostatic by contraction.

The chief use of Opium is to relieve pain from any cause, produce sleep, to allay irritation in acute nervousness, to check excessive secretion, as in dysentery diabetes.

Opium and Morphine will relieve pain from any cause except acute inflammation of the brain.

Pills of Opium, not U. S. P., contain one grain of Opium made into a mass with soap and water.

Magendies' Solution of Morphine contains 16 grains to fl. oz.

Godfrey's Cordial contains $\frac{1}{2}$ gr. Opium to ounce.

Tincture of Opium (Laudanum) contains 48 grains Opium to the fluid ounce.

Ten minims equals one grain of Opium or $\frac{1}{8}$ grain Morphine. Sixty minims of this tincture equals about 120 drops.

Half an ounce of Paregoric contains one grain of Opium, or $\frac{1}{8}$ grain Morphine. Dose for infant, 5 to 20 gtts.

Apomorphine Hydrochloride is the most powerful emetic known. It is the hydrochloride of an alkaloid obtained from Morphine.

Dose—Expectorant dose, $1/20$; emetic by mouth, $1/6$, and hypodermatically, $1/12$ grain.

Hypnotics are drugs which produce sleep.

Narcotics are drugs which produce sleep and relieve pain.

The antidote for Opium and Morphine: Strong coffee, stomach pump, Permanganate of Potash in 4-grain doses dissolved in water, given by the mouth every 15 minutes, which destroys the Morphine by oxidation. Atropine is the physiological antidote.

Atropine and Morphine are frequently prescribed in combination in proportion to Atropine $1/120$ and Morphine $1/4$. The anodyne and hypnotic effects of Morphine are decreased and nausea and depression are avoided. Atropine in the above doses is a cardiac and respiratory stimulant and will counteract the depressing effect of Morphine on the heart.

Tincture Opii, called Laudanum. made from Granulated Opium by pouring boiling water upon it and let stand for 12 hours, then add alcohol and let stand for 24 hours, then percolate with dilute alcohol. Dose, 8. minims.

All Opium preparations are 10% strength except Paregoric which is $2/5$, and the Extract which is 20.

Tinctura Opii Camphorata, Camphorated Tincture of Opium, is Paregoric. The P. I. name is *Opii Tinctura Benzoici*. It contains Powdered Opium, Benzoic Acid, Camphor, Oil of Anise, Glycerin and Dilute Alcohol. Made by macerating for three days and filter. Dose, one fluid drachm.

Children are much more susceptible to Opium and Morphine than adults. To a child one day old, one drop of Laudanum has proven fatal. A nursing mother given an adult dose caused death to the infant.

Official name: *Hydrastis*; Common name: Golden Seal, Yellow Root, Yellow Purcoon; Pharmacopeial definition: Rhizome and roots of *Hydrastis Canadensis*, yielding 2.5% ether-soluble alkaloids of *Hydrastis*; Natural order or family: *Ranunculaceae*; Habitat: N. A.; Medical properties: Alterative; Active constituents: Hydrastine, Berberine; Dose, 30 grs.; U. S. P. Preparations: Ext. F. E., Tr. Glycerite.

Official name: *Cimicifuga*; Common name: *Macrotys*, Black Snakeroot, Black Cohosh; Pharmacopeial definition: Rhizome and roots of *Cimicifuga Racemosa*; Natural order or family: *Ranunculaceae*; Habitat: N. A.; Medical properties: Anti-spasmodic; Active constituents: Cimicifugin, Macrotin; Dose: 15 grs.; U. S. P. Preparations: Ext. and F. E.

Official name: *Staphisagria*; Common name: *Stavesacre*; Pharmacopeial definition: Seed of *Delphinium*, *Staphisagria*; Natural order or family: *Ranunculaceae*; Habitat: Europe; Medical properties: Stimulant; Active constituent: Delphinine; Dose, 1 gr.

It is also used externally for vermin.

Delphinium Consolidum is Larkspur, N. F.

Official name: *Aconitum*; Common name: Aconite, Monk's Hood; Pharmacopeial definition: The tuberous root of *Aconitum Napellus*, yielding .5% Aconitine; Natural order or family: *Ranunculaceae*; Habitat: Europe; Medical properties: Sedative; Active constituent: Aconitine; Dose: $\frac{1}{2}$ gr.; U. S. P. Preparations Ext., F. E. and Tinc.

Notes on Above Drugs — *Hydrastis* is used as an alterative and tonic. It is especially good for sore mouth caused from syphilis. In powder or given in capsules, it is good for ulcerated stomach. In liquid for use as injection for gonorrhea and catarrhal affections. The Glycerite is the only preparation of it that will mix with water without precipitating the yellow resin. It contains a glucoside, Hydrastin. Hydrastine, the alkaloid, differs from Berberine by being soluble in ether and insoluble in water. Hydrastine is white and Berberine is yellow.

Hydrastinine Hydrochloride is the hydrochloride of an artificial alkaloid derived from Hydrastine. Dose, $\frac{1}{4}$ gr. It is an oxytocic.

Aconite contains the alkaloids Aconitine, U. S. P. Benzaconine, and Aconine. Benzaconine with a mixture of Aconine forms an alkaloid called Napelline.

Aconitine is U. S. P. and the dose is $\frac{1}{400}$ of a grain. It is a white powder soluble in alcohol and chloroform.

When Aconite is chewed it is very bitter and produces a tingling or numbness of the tongue.

Aconite is very poisonous and should be tasted with caution. Dose, $\frac{1}{2}$ gr. F. E., $\frac{1}{2}$ minim. Tincture, 5 minims. Fleming's Tr. is 70% strength. Dose, 1 minim.

It is best administered in small doses and repeated often.

Official name: *Valeriana*; Common name: Valerian; Pharmacopeial definition: Rhizome and roots of *Valeriana Officinalis*; Natural order or family: *Valerianaceae*; Habitat: Europe; Medical properties: Antispasmodic; Active constituents: Valeric Acid, Formic Acid; Dose: 30 grs.; U. S. P. Preparations: Tr., Ammoniated Tinct.

Valerian is a perennial plant with small white or rose-colored flowers, growing in ditches and moist woods of Asia. Its name was derived from the word meaning strong.

Valeric Acid is an organic acid with a characteristic odor and a volatile liquid. Can be obtained from Valerian by distilling the roots with water containing H_2SO_4 , but it is not the Valeric Acid of Pharmacy, as that is obtained by the oxidation of fats, or Amylic Alcohol, from which the various Valerianates are prepared.

Official name: *Guaiacum*; Common name: *Guaiac*; Pharmacopeial definition: Resin of the wood *Guaiacum Officinale*; Natural order or family: *Zygophyllaceae*; Habitat: S. A.; Medical properties Anti-rheumatic; Active constituent: Guaiaconic Acid; Dose: 15 grs.

The Guaiac Tree grows to a height of about 60 feet, in Cuba and Jamaica. The wood is exported in billets 3 to 5 feet long, the heartwood being used. It is of greenish brown color.

Guaiacic Acid resembles Benzoic Acid. The U. S. P. Preparations are the Tincture and the Ammoniated Tincture.

We have two Tinctures made with Aromatic Spirit of Ammonia as the menstrum; they are Valerian and Guaiac.

Official name: *Linum*; Common name: Linseed, Flaxseed; Pharmacopeial definition: The ripe seed of *Linum Usitatissimum*; Natural order or family: *Linaceae*; Habitat: Europe; Medical properties: Demulcent; Active constituents: Oil and Mucilage.

Oleum Lini is Linseed Oil and a fixed oil expressed without

heat from the Flaxseed. It acts as a laxative but used mostly in medicine externally. It enters into Lime Liniment and Solution of Cresol. It is commonly called raw Linseed Oil.

Boiled Linseed Oil contains Lead Acetate and Lead Oxide and is poison.

Official name: *Sabal*; Common name: Saw Palmetto Berries; Pharmacopeial definition: The partially dried, ripe fruit of *Serenoa Serrulata*; Natural order or family: *Palmae*; Habitat: U. S.; Medical properties: Diuretic; Active constituent: Oil; Dose: 15 grs.; U. S. P. Preparations: Fluid Extract.

Saw Palmetto grows in Florida to a height of 40 to 50 feet. It belongs to the palm family. It is a sedative and nutritive tonic. It has specific action on the prostate gland. It is good in the late stages of gonorrhea, prostatic enlargement and irritable bladder.

Official name: *Althaea*; Common name: Marshmallow Root; Pharmacopeial definition: The root of *Althea Officinalis*; Natural order or family: *Malvaceae*; Habitat: Europe; Medical properties: Demulcent; Active constituents: Starch, Asparagin.

Althaea is used as an absorbent powder in making pill masses, and enters into Pill Phosphorous, Mass of Mercury, and Pill Carbonate of Iron.

Official name: *Gossypium Purificatum*; Common name: Purified Cotton, Absorbent Cotton; Pharmacopeial definition: The hairs of the seed *Gossypium Herbaceum*; Natural order or family: *Malvaceae*.

Oleum Gossypii Seminis, Cotton Seed Oil. It is a fixed oil expressed from the seed of cultivated varieties of *Gossypium Herbaceum*.

Official name: *Digitalis*; Common name: Foxglove; Pharmacopeial definition: The leaves of *Digitalis Purpurea*; Natural order or family: *Scrophulariaceae*; Habitat: Europe; Medical properties: Stimulant, Diuretic; Active constituents: Digitalin, Digitoxin, Digitonin; Dose: 1 gr.; U. S. P. Preparations: F. E., Tr., Inf.

The U. S. P. states that *Digitalis* must be assayed biologically, that is, the minim lethal dose should not be greater than one-tenth

of a minim of the tincture or the equivalent of 7/1000000 of grain of ouabain (wah-bah-in) for each 15 grains of body weight of frog.

Ouabain is a glucocide from an African arrow poison. It is a heart poison.

The value of *Digitalis* leaves is based on the amount of Digitoxin that the leaves contain.

Digitalin and *Digitoxin* are the cardiac principles and are soluble in alcohol.

Digitonin represents the diuretic principle and is soluble in water.

French Digitalin, not U. S. P., consists largely of Digitoxin. Dose, 1/200 gr.

German Digitalin, not U. S. P., consists of a mixture of Digitalin and Digitonin. Dose, 1/60 gr.

The active constituents of *Digitalis* are glucocides.

Digitalis is a cumulative poison, that is, one which increases suddenly in its action after slow additions of it.

Leptandra belongs to the above family, but is not U. S. P. The common name is Culver's Root or Culver's Physic.

The family *Orchidaceae* contains *Cypripedium*, or Lady's Slipper, and *Vanilla*. Both are in the N. F.

The *Vanilla* fruit known as *Vanilla Beans* are collected before they are ripe and wrapped in woolen blankets and exposed to the noonday sun for several days or until they assume a dark brownish color, at this point Vanillin is developed.

Vanillin in U. S. P. is the Methyl-*proto-catechuic-aldehyde*, naturally existing in the *Vanilla* fruit. It is also prepared synthetically by the oxidation of Eugenol, which is the active constituent of Oil of Cloves. The dose of Vanillin is 1 gr. Used mostly for making the artificial Tincture of *Vanilla*, but is claimed as a stimulant.

How much Bichloride in one pint of solution 1 to 1500? 455 (number of grains in ounce of water) multiplied by 16 (number of ounces in pint) equals 7,280 (number grains in pint of water), so they want one grain of Bichloride to every 1,500 grains of

water, so 7,280 divided by 1,500 equals 4.8, which is the number of grains of Bichloride to be used.

Suppose you wanted to make four ounces of a solution of Bichloride so that when one teaspoonful is added to a pint of water it will make a solution 1 to 1,500, how much Bichloride would you use? It takes 4.8 grains of Bichloride to make one pint 1 to 1,500, and four ounces is equal to 32 teaspoonfuls, so 32 multiplied by 4.8 is equal to 153 grains to be put in the four ounce bottle.

Official name: *Stillingia*; Common name: Queen's Root; Pharmacopeial definition: Roots of *Stillingia Sylvatica*; Natural order or family: *Euphorbiaceae*; Habitat: U. S.; Medical properties: Alterative; Active constituent: Resin; Dose: 30 grains; U. S. P. Preparations: F. E.

Official name: *Oleum Ricini*; Common name: Castor Oil; Pharmacopeial definition: A fixed oil from *Ricinus Communis*; Natural order or family: *Euphorbiaceae*; Habitat: Europe; Medical properties: Cathartic; Active constituent: Ricin; Dose: $\frac{1}{2}$ oz.

Official name *Oleum Tiglli*; Common name: Croton Oil; Pharmacopeial definition: A fixed oil from seed of *Croton Tiglium*; Natural order or family: *Euphorbiaceae*; Habitat: Europe; Medical properties: Drastic cathartic; Active constituents: Croton, resin; Dose: 1 minim.

Elastica is India rubber. It is the prepared milk juice of several species of Heva. It is used in making plasters. When rubber is pure it will float on water. It is usually adulterated with lead and zinc.

Vulcanized Rubber is heating rubber with sulphur.

Castor Oil and *Croton Oil* are two fixed oils that are soluble in alcohol.

Official name: *Mentha Piperita*; Common name: Peppermint; Pharmacopeial definition: Leaves and tops of *Mentha Piperita*; Natural order or family: *Labiatae*; Habitat: U. S.; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 60 Spt.

Official name: *Mentha Viridis*; Common name: Spearmint;

Pharmacopeial definition: Leaves and tops of *Mentha Viridis*; Natural order or family: *Labiatae*; Habitat: U. S.; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 60 Spt.

Hedeoma is Pennyroyal.

Scutillaria is Scull Cap.

Marrubium is Horehound.

Salvia is Sage.

This order also contains Thyme, Rosemary, Lavender, and Catnip, but none is U. S. P., except Spearmint and Peppermint.

Official name: *Jalap*; Common name: Jalap; Pharmacopeial definition: The tuberous root of *Exogonium Purga*, yielding not less than 7% resin; Natural order or family: *Convolvulaceae*; Habitat: Mexico; Medical properties: Hydrogue cathartic; Active constituents: Jalapin, Convolvulin; Dose: 15 grs.; U. S. P. Preparations: Powd. Resin.

Official name: *Scamoniae Radix*; Common name: Scammony Root; Pharmacopeial definition: Root of *Convolvulus Scammony*, yielding 8% resins; Natural order or family: *Convolvulaceae*; Habitat: Asia; Medical properties: Hydrogue cathartic; Active constituent: Resin; Dose: 4 grs.; U. S. P. Preparations: Resin.

Official name: *Uva Ursi*; Common name: Bearberry; Pharmacopeial definition: Leaves of *Orctostaphylos Uva Ursi*; Natural order or family: *Ericaceae*; Habitat: U. S.; Medical properties: Diuretic; Active constituent: Arbutin; Dose: 30 grs.; U. S. P. Preparations: F. E.

Chimaphila is *Pipsissewa*, or Princess Pine, and belongs to the above order. It is very similar to *Uva Ursi*, both containing Arbutin, a bitter glucoside.

Diospyros is Latin for Persimmon; was used as astringent.

Jalap is better when worm eaten, as the worms eat out the starch and leave the resin.

Convolvulin is the most active of the two principles and is soluble in Ether.

Resin of Jalap enters into both C. C. Pills.

Official name: *Hydrastis*; Common name: Golden Seal; Phar-

macopeial definition: Rhizome and roots of *Hydrastis Canadensis*, yielding 2.5% of ether-soluble alkaloids; Natural order or family: *Ranunculaceae*; Habitat: N. A.; Medical properties: Alterative; Active constituents: Hydrastine, Berberine; Dose: 30 grs.; U. S. P. Preparations: Ext., F. E., Glycerite, Tr.

Official name: *Cimicifuga*; Common name: *Macrotys*, Black Snakeroot, Black Cohosh; Pharmacopeial definition: Rhizome and roots of *Cimicifuga Racemosa*; Natural order or family: *Ranunculaceae*; Habitat: N. A.; Medical properties: Anti-spasmodic; Active constituents: Cimicifugin, Macrotin; Dose: 15 grs.; U. S. P. Preparations: F. E., Ext.

Official name: *Staphisagria*; Common name: *Stavesacre*; Pharmacopeial definition: The ripe seed of *Delphinium Staphisagria*; Natural order or family: *Ranunculaceae*; Habitat: Europe; Medical properties: Stimulant, externally for vermin; Active constituent: Delphine; Dose: 1 gr.; U. S. P. Preparations: F. E.

Official name: *Aconitum*; Common name: Aconite, Monk's Hood; Pharmacopeial definition: The tuberous root of *Aconitum Napellus*, yielding .5% ether-soluble alkaloids; Natural order or family: *Ranunculaceae*; Habitat: Europe; Medical properties: Sedative; Active constituent: Aconitine; Dose: $\frac{1}{2}$ gr.; U. S. P. Preparations: Tr., Ext. and F. E.

Notes.—*Aconitine* is an official alkaloid obtained from Aconite. The dose is $\frac{1}{400}$ of a grain.

Aconite is very poisonous and should be stated with care. The dose is $\frac{1}{2}$ gr. The dose of the tincture is 5 minims, the dose of the fluid extract is $\frac{1}{2}$ minim. When Aconite is tasted it produces a tingling or numbness of the tongue.

The Antidote for Aconite is stimulants, such as *Digitalis* and *Strychnine*, stomach pump.

Externally Aconite is used as an anodyne. It is valuable in liniments for neuralgia. It is valuable with Iodine in toothache, by painting the gums. Aconite should be applied with caution to abraded surfaces, as it is readily absorbed. Aconite produces better results when given in small doses frequently than in larger doses and less frequent.

Fleming's Tincture Aconite, not U. S. P., is 70% strength. Fleming delivered an essay on Aconite in 1844, for which he received a medal from the University of Edinburg.

Hydrastine is a white crystalline alkaloid soluble in alcohol and ether, insoluble in water.

Berberine is a yellow crystalline alkaloid, soluble in hot water, insoluble in ether.

Hydrastis is a valuable drug in ulcerated stomach. As an antiseptic and alterative application to ulcers and sores, especially those caused by syphilis. In gonorrhea it is valuable in the second stages, injected in solution.

The alkaloid *Delphinine* is used in neuralgia, palpitation and rheumatism, in doses of 1/60 gr. Also in 1% ointment for pediculosis (body lice). Larkspur is more common for this in liquid form. It is *Dephinium Consolida*.

Official name: *Belladonnae Folia*; Common name: Belladonna Leaves, Deadly Nightshade; Pharmacopeial definition: The leaves of *Atropa Belladonna*, yielding .3% total alkaloids; Natural order or family: *Solanaceae*; Habitat: Europe; Medical properties: Sedative; Active constituents: Atropine, Belladonnine, Hyoscyamine; Dose: 1 gr.; U. S. P. Preparations: Ext., Tr., Oint.

Official name: *Belladonnae Radix*; Common name: Belladonna Root; Pharmacopeial definition: The roots of *Atropa Belladonna*, yielding .45% total alkaloids; Natural order or family: *Solanaceae*; Habitat: Europe; Medical properties: Sedative; Active constituents: Atropine, Belladonnine, Hyoscyamine; Dose: ¾ gr.; U. S. P. Preparations: F. E. and Liniment.

Official name: *Stramonium*; Common name: Jimson Weed, Jamestown Weed; Pharmacopeial definition: The leaves of *Datura Stramonium*, yielding .25% total alkaloids; Natural order or family: *Solanaceae*; Habitat: Europe; Medical properties: Narcotic; Active constituents: Daturine, Atropine, Hyoscyamine, Hyoscine; Dose: 1 gr.; U. S. P. Preparations: Ext., Tr., Ointment.

Official name: *Hyoscyamus*; Common name: *Henbane*; Pharmacopeial definition: Leaves and flowering tops of *Hyoscyamus*

Niger, yielding not less than 0.065% of the alkaloids of *Hyoscyamus*; Natural order or family: *Solanaceae*; Habitat: Europe; Medical properties: Anodyne, Narcotic; Active constituents: Hyoscyamine, Hyoscyamine; Dose: 4 grs.; U. S. P. Preparations: Ext., F. E., Tr.

Official name: *Capsicum*; Common name: Cayenne Pepper, Red Pepper, African Chillies; Pharmacopeial definition: The ripe fruit of *Capsicum Frutescens*; Natural order or family: *Solanaceae*; Habitat: Africa; Medical properties: Stimulant; Active constituents: Oil and Resin; Dose: 1 gr.; U. S. P. Preparations: Tr., Oleo-resin.

Notes.—The above order is known as the Nightshade family and is one of the most important. It contains 1,750 species, among which are the Eggplant, Tobacco, Tomato.

Belladonna, meaning Beautiful Lady, is cultivated in the U. S. It is a bush growing from 2 to 4 feet in height with bell-like, purple flowers, and berries black and about the size of a cherry.

Belladonna relieves pain, stimulates the circulation, decreases secretion. It increases the rate but not the force of the heart. (*Digitalis* opposite.)

Atropine and *Atropine Sulphate* are U. S. P. The dose of each is 1/120 grain. They are used to dilate the pupil of the eye and paralyze the accommodation of the eye. In small doses they increase the action of the heart and are a spinal stimulant. In large doses they paralyze the heart and spinal cord.

In ocular diseases the strength of the solution should not be more than 4 grains to the ounce. It is frequently used in ophthalmic diseases.

In opium poisoning it is given in small doses and repeated often. In cases of over-inhalation of Chloroform or Ether it has restored life where all others have failed.

Symptoms of Atropine and Belladonna Poisoning: Dryness of mouth and throat, redness of the face, quick and irregular pulse, vomiting and diarrhea. Full doses of Morphine is physiological antidote.

Homatropine Hydrobromide is the Hydrobromide of Homatro-

pine, an alkaloid obtained by the condensation of Tropine and Mandelic Acid. Dose 1/120 gr. It slows the heart. It is preferred to Atropine as a mydriatic, as the effects last only one-fourth as long.

Stramonium is a strong weed growing from 2 to 6 feet in height, with large flowers and pods and black seed. It is called Stink Weed. It grows wild in Russia and United States. It is also known as Thornapple.

Daturine is a mixture of Atropine and Hyoscyamine.

Stramonium acts similar to Belladonna in every respect, except it is more powerful and causes cardiac irregularity and delirium. The antidote is the same as Belladonna.

Hyoscyamus is a bushy annual or biennial plant, 1 to 4 feet in height, with yellow flowers.

Hyoschamus is a feeble narcotic especially adapted for children. It is especially good in insomnia and delusions. It is used in combination with purgatives and is best prescribed in 4-grain doses in powder form. The tincture is an effective remedy in irritated bladder from any cause.

Scopola belongs to the family Solanaceae, but it is not U. S. P. Scopolamine is its alkaloid and Scopolamine Hydrobromide is official. It is identical with Hyoscine from *Hyoscyamus*.

Scopolamine is a cerebral (brain) and spinal sedative and a powerful hypnotic and affects the heart but feebly; very likely this is the alkaloid which prevents *Hyoscyamus* from causing the delirious effects of Belladonna. It is frequently used as hypnotic for alcoholics and extreme nervousness.

Scopolamine-Morphine are used to lessen the pain in childbirth and is what is known as the famous "twilight sleep," being injected in Scopolamine 1/150 and Morphine 1/6 when the pains are about five minutes apart and the patient sleeps between pains.

Stramonium is anti-spasmodic and is used in Asthma by burning and inhaling the smoke. The following prescription is an illustration:

R Pulv. Belladonnae The Saltpetre is dissolved in a
 Pulv. Stramonium aa ozl small quantity of water, mixed
 Pot. Nitrate qs. with the powders and allowed to
 Sig.: Burn and inhale. dry.

Paprika is American Red Pepper grown in Texas.

Official name: *Ulmus*; Common name: Elm, Slippery Elm;
 Pharmacopeial definition: The bark of *Ulmus Fulva* deprived
 of its corky layer; Natural order or family: *Ulmaceae*; Habitat:
 U. S.; Medical properties: Demulcent; Active constituent: Mu-
 cilage.

Official name: *Humulus*; Common name: Hops; Pharmacopeial
 definition: Strobiles of *Humulus Lupulus*, bearing their glandular
 trichomes; Natural order or family: *Moraceae*; Habitat: Europe;
 Medical properties: Tonic; Active constituent: Lupulin; Dose:
 30 grains.

Official name: *Cannabis*; Common name: Guaza, Ganjah, Can-
 nabis Indica; Pharmacopeial definition: The flowering tops of
 the pistillate plants of *Cannabis Sativa*, assayed biologically;
 Natural order or family: *Moraceae*; Habitat: India; Medical
 properties: Narcotic, Anodyne; Active constituents: Cannabin,
 Volatile Oil; Dose: 1 gr.; U. S. P. Preparations: Ext., F. E.,
 Tinct.

Notes.—*Lupulin* is the trichomes of hops; it was U. S. P. in 8th.

Strobiles are a complete cluster of scales which surround the
 flower.

Cannabis in a way has died out as a hypnotic and anodyne,
 however, it is useful in many cases, such as the burning and pain-
 ful affections of the bladder, and allays cordee. Equal parts of
 the Tr. and F. E. Ergot with 10 grains Sodium Bromide to the
 teaspoonful is very effective for prolonged menstruation (or flood-
 ing).

An aqueous solution of this drug is used by the natives to pro-
 duce intoxication.

Gunjah is the dried leaf which is sold by the natives for smok-
 ing purposes.

Cannabin is resin and is claimed by some to be less valuable than the volatile oil.

Official name: *Quercus*; Common name: White Oak; Pharmacopeial definition: The bark of *Quercus Alba*; Natural order or family: *Cupuliferae*; Habitat: N. A.; Medical properties: Astringent; Active constituent: Tannin. It is not U. S. P.

Official name: *Galla*; Common name: Nutgall; Pharmacopeial definition: Excrescences on the young twigs of *Quercus Infectoria* caused by the puncture and deposited ova of *Cynips Tinctoria*; Natural order or family: *Fagaceae*; Habitat: Europe; Medical properties: Astringent; Active constituent: Tannin; Dose: 8 grs.; U. S. P. Preparations: Ointment.

Acidum Tannicum, Tannic Acid, called Tannin, is an organic acid prepared from nutgalls by exposing the galls for three days in a damp atmosphere, then macerate with Ether, pressing and drying the liquid portion. It is a yellowish white to a brown amorphous powder, gradually turning darker on exposure. It is very soluble in water and alcohol and soluble in 1 to 1 Glycerin by aid of gentle heat. It is insoluble in Ether, Chloroform or Benzin. The glycerite troches and ointment are U. S. P.

Acidum Galicum, Gallic Acid. It is an organic acid prepared from Tannic Acid. It is a white or pale fawn-colored powder. The dose is 15 grs. It differs from Tannic Acid by not precipitating alkaloids from their solutions and not coagulating Albumen and Gelatin.

Pyrogallol, called Pyrogallic Acid. It is a Trihydroxybenzene $C_6H_3(OH)_3$, obtained by the sublimation of Gallic Acid. It is used as an antiseptic and disinfectant; in 1 to 3% solutions. Can be used internally for hemorrhages in 2-grain doses.

Official name: *Viburnum Prunifolium*; Common name: Black Haw; Pharmacopeial definition: The bark of *Viburnum Prunifolium*; Natural order or family: *Caprifoliaceae*; Habitat: Europe; Medical properties: Nervine; Active constituents: Verburin, Valeric Acid; Dose: 30 grs.; U. S. P. Preparations: Ext., F. E.

Official name: *Viburnum Opulus*; Common name: Cramp Bark;

Pharmacopeial definition: The bark of *Viburnum Opulus*; Natural order or family: *Caprifoliaceae*; Habitat: Europe; Medical properties: Nervine; Active constituent: Valeric Acid; not U. S. P.

Black Haw is considered nervine, anti-spasmodic, astringent, diuretic and tonic properties, and especially useful in preventing abortion in the nervous diseases of pregnancy.

Cramp Bark is said to prevent uterine and abdominal pains, but on account of its infrequent use was dismissed from the U. S. P.

A few Latin names of unofficial drugs:

Casta'nea is Chestnut leaves, used for whooping cough in form of infusion.

Panax is the American Ginseng, used by the Eclectics for dyspepsia.

Cornus Florida is Dogwood, used as an astringent.

Ampoules are sealed glass containers holding from 1 to 5 mils. of a sterile solution to be injected intravenously.

A medicine dropper should have an external diameter of 3 millimeters and discharge distilled water so that twenty (20) drops would weigh one gramme. (One millimeter is $\frac{1}{25}$ of inch.)

Official name: *Prunus Virginiana*; Common name: Wild Cherry, Wild Black Cherry; Pharmacopeial definition: The bark of *Prunus Virginiana*; Natural order or family: *Rosaceae*; Habitat: U. S.; Medical properties: Sedative; Active constituents: HCN, Volatile Oil; Dose: 30 grs.; U. S. P. Preparations: Syrup.

Official name: *Rosa Gallica*; Common name: Red Rose; Pharmacopeial definition: The dried petals of *Rosa Gallica*, collected just before the expansion of the flower; Natural order or family: *Rosaceae*; Habitat: Europe; Medical properties: Astringent; Active constituent: Quercitrin; U. S. P. Preparations: F. E.

Official name: *Amygdala Dulcis*; Common name: Sweet Almond; Pharmacopeial definition: The ripe seed of *Prunus Amygdalus Dulcis*; Natural order or family: *Rosaceae*; Habitat: Asia; Medical properties: Demulcent; Active constituent: Fixed Oil; U. S. P. Preparations: Emulsion.

Official name: *Oleum Amygdalae Expressum*; Common name: Oil of Sweet Almond; Pharmacopeial definition: A fixed oil expressed from the kernels of *Prunus Amygdalus*; Natural order or family: *Rosaceae*; Habitat: Asia; Medical properties: Laxative; Active constituent: Olein; Dose: 1 oz.; U. S. P. Preparation: Ointment of Cold Cream.

Notes.—Sweet Almond are much larger than the bitter.

Wild Cherry is a small tree growing in Canada and the United States. The bark contains an amygdalin and emulsin which react on each other and form the Hydrocyanic Acid and a volatile oil resembling that of Bitter Almond. Wild Cherry is an aromatic bitter tonic, but it is used mostly in cough mixtures.

Some unofficial drugs of this family:

Rubus Villosus is Blackberry.

Rubus Idaeus is Raspberry.

Cydonium, Quince Seed, valuable for their mucilage.

Quillaja, Soap Bark, the bark of *Quillaja Saponaria*.

Official name: *Cubeba*; Common name: Cubeb, Cubebs; Pharmacopeial definition: The dried full-grown unripe fruit of *Piper Cubeba*; Natural order or family: *Piperaceae*; Habitat: W. I.; Medical properties: Diuretic; Active constituents: Volatile Oil, Cubebic Acid; Dose: 10 grs.; U. S. P. Preparation: Troche Oleoresin.

Official name: *Piper*; Common name: Pepper, Black Pepper; Pharmacopeial definition: The dried unripe fruit of *Piper Nigrum*; Natural order or family: *Piperaceae*; Habitat: W. I.; Medical properties: Stimulant; Active constituents: Oil and Resin; Dose: 8 grs.; U. S. P. Preparation: Oleoresin.

Notes.—Cubebs are picked while green and become wrinkled on drying. It is a climbing shrub and the fruit grows in clusters, cultivated in Java. Their value is due to the Cubebic Acid, which is the diuretic principle. It stimulates the genito-urinary passage, increasing the sweat and urine. It is very useful in affections of the bladder and urethra. It may be smoked in cigarettes for temporary relief in acute nasal catarrh. The troches are used

by public speakers and singers for hoarseness and tonic effect on the organs of the throat.

Pepper acts as an irritant locally and as a warm carminative and stimulant on both the heart and kidneys.

Matico, known as "Soldier's Friend," is an astringent drug belonging to the above order, but not U. S. P.

Official name: *Manna*; Common name: *Manna*; Pharmacopeial definition: Dried saccharine exudation of *Fraxinus Ornus*; Natural order or family: *Oleaceae*; Habitat: Europe; Medical properties: Laxative; Active constituent: Mannite; Dose: $\frac{1}{2}$ oz.; U. S. P. Preparations: Inf. Senna Co.

Official name: *Oleum, Olivae*; Common name: Olive Oil; Pharmacopeial definition: A fixed oil obtained from the ripe fruit *Olea Europaea*; Natural order or family: *Oleaceae*; Habitat: Europe; Medical properties: Laxative; Active constituents: Olein and Palmatin; Dose: 1 oz.; U. S. P. Preparation: Lead Plaster.

Notes.—*Fraxinus Ornus* is the flowering ash, a tree of Southern Europe.

Manna is a mild laxative and is usually given with Senna, Rhubarb, etc., to disguise the taste. Its active constituent, Mannite, is chemically a Hexahydric Alcohol, also called Manitol. A substance resembling Manna is obtained from several plants as well as the bay tree, but this does not contain Mannite.

Official name: *Myrrha*; Common name: Myrrh, Gum Myrrh; Pharmacopeial definition: A gum-resin obtained from *Commiphora Myrrha*; Natural order or family: *Burseraceae*; Habitat: Arabia; Medical properties: Antiseptic; Active constituent: Myrrhin; Dose: 8 gr. pill; U. S. P. Preparations: Tinct. Rhei Co.

Notes.—Myrrh is an antiseptic and especially good for old inflamed surfaces in combination with Comp. Tr. Benzoin. Mixed with water it is a good gargle for sore throat. It forms an emulsion with water if mixed properly. The variety is Turkey.

Official name: *Quassia*; Common name: Bitter Wood; Pharmacopeial definition: The wood or *Picrasma Excelsa*; Natural order or family: *Simarubaceae*; Habitat: W. I.; Medical properties:

Tonic: Active constituent: Picrasmin; Dose: 8 grs.; U. S. P. Preparation: Tincture.

Notes.—*Quassia* is a bitter tonic employed in dyspepsia and a strong infusion as an enema against thread worms. It is poisonous to flies, fish, rabbits and dogs.

The excelsa is known as Jamaica Quassia, and the amara Surinam Quassia.

It comes to the market in cups or chips, the latter mostly, from a Dutch colony of S. A.

Euonymus is Wahoo, N. F. It is classed with Rheubarb, Jalap, Aloes, etc.

Official name: *Mezereum*; Common name: *Mezereon*; Pharmacopeial definition: The bark of *Daphne Mezereum* and other species of *Daphne*; Natural order or family: *Thymeleaceae*; Habitat: Europe; Medical properties: Sialagogue; Active constituent: Daphnin; U. S. P. Preparations: F. E., Sarsaparilla Co.

Notes.—The above is a shrub growing from 2 to 4 feet high with rose red or purple flowers. It grows in the mountainous districts of Europe and Asia and cultivated as a flower in England and United States. The root bark is the strongest but the stem bark is more common. The fresh bark is a powerful irritant and will produce blisters. It is used mostly in combination as an alterative in syphilis.

Official name: *Eriodictyon*; Common name: *Yerba Santa*, Consumption Weed, Mountain Balm; Pharmacopeial definition: The leaves of *Eriodictyon Californicum*; Natural order or family: *Hydrophyllaceae*; Habitat: U. S.; Medical properties: Expect.; Active constituent: Resin; Dose: 15 grs.; U. S. P. Preparations: F. E.

Notes.—*Eriodictyon* is used to disguise the taste of bitter drugs, as Quinine. The fluid extract in water as a mouth wash is the better way, as it paralyzes the sense of taste.

Calamus is Sweet Flag, not U. S. P.; bitter tonic.

Official name: *Styrax*; Common name: Storax; Pharmacopeial definition: A balsam from the wood of *Liquidamber Orientalis*; Natural order or family: *Hamamelidaceae*; Habitat: Asia; Medi-

cal properties: Expct.; Active constituent: Cinnamic Acid; Dose: 15 grs.; U. S. P. Preparations: Tr., Benz. Co.

Notes.—*Styrax* is obtained from a tree, Oriental Sweet Gum. It is a stimulant, expectorant, antiseptic and disinfectant. It is similar to Benzoin.

Hamamelidaceae also contains *Hamamelis Cortex* and *Hamamelis Folio*, which is Witch Hazel. They are not U. S. P., but the water is. The F. E. is made from the leaves.

Official name: *Granatum*; Common name: Pomegranate; Pharmacopeial definition: The bark of the stems and roots of *Punica Granatum*; Natural order or family: *Punicaceae*; Habitat: Europe; Medical properties: Taenifuge; Active constituent: Pelletierine; Dose: 30 grs.; U. S. P. Preparations: F. E.

Pelletierine is a mixture of alkaloids, and the tannate is U. S. P. The dose is 4 grains.

Official name: *Xanthoxylum*; Common name: Prickly Ash Bark; Pharmacopeial definition: The bark of *Xanthoxylum Americanum* (Northern), the bark of *Clava-Herculis* (Southern); Natural order or family: *Rutaceae*; Habitat: U. S.; Medical properties: Alterative; Active constituent: Oil; Dose: 30 grs.; U. S. P. Preparations: F. E.

Official name: *Buchu*; Common name: *Buchu*; Pharmacopeial definition: The dried leaves of *Baroma Betulina* (short), the dried leaves of *Barosma Serratifolia* (long); Natural order or family: *Rutaceae*; Habitat: Africa; Medical properties: Diuretic; Active constituent: Rutin; Dose: 30 grs.; U. S. P. Preparations: F. E.

Official name: *Pilocarpus*; Common name: *Jaborandi*; Pharmacopeial definition: Leaves of *Pilocarpus Jaborandi*; Natural order or family: *Rutaceae*; Habitat: S. A.; Medical properties: Diaphoretic; Active constituent: Pilocarpine; Dose: 30 grs.; U. S. P. Preparations: F. E.

Official name: *Aurantii Amara Cortex*; Common name: Bitter Orange Peel; Pharmacopeial definition: The dried rind of the fruit *Aurantium Amara*; Natural order or family: *Rutaceae*; Habitat: U. S.; Medical properties: Carminative; Active con-

stituent: Hesperidin; Dose: 15 grs.; U. S. P. Preparations: F. E., Tr., Tr. Gent. Co., Tr. Cinc. Co.

Official name: *Aurantii Dulcis Cortex*; Common name: Sweet Orange Peel; Pharmacopeial definition: The outer rind of the fresh, ripe fruit of *Citrus Aurantium Sinensis*; Natural order or family: *Rutaceae*; Habitat: U. S.; Medical properties: Carminative; Active constituent: Volatile Oil; U. S. P. Preparations: Tincture.

Notes.—We get three oils from the orange tree. From the fruit we get the U. S. P. Volatile Oil of Orange. From the flower of both the bitter and sweet we get Neroli Oil, and in France, where these oils are produced, the first is known as Bigarade and the latter as Portugal. From the leaves and young shoots we get an oil known as Petit grain. The last two oils are used exclusively in perfumery.

Official name: *Aspidium*; Common name: Male Fern, *Filix-mas*; Pharmacopeial definition: Rhizome and stipes of *Dryopteris Filix-mas*, collected in autumn; Natural order or family: *Poly-podiaceae*; Habitat: N. A.; Medical properties: Taenifuge; Active constituent: Filicic Acid; Dose: 60 grs.; U. S. P. Preparation: Oleoresin.

Aspidium should not be used after it is two years old. Only the green portion should be used.

Castor Oil should never follow *Aspidium*, as it increases absorption.

Official name: *Ipecacuanha*; Common name Ipecac; Pharmacopeial definition: The roots of *Cephaelis Ipecacuanha*, yielding 1.75% alkaloids; Natural order or family: *Rubiaceae*; Habitat: Brazil; Medical properties: Emetic, Expectorant; Active constituents: Cephaeline, Emetine; Emetic Dose: 15 grs.; U. S. P. Preparations: F. E., Dover's Powd. and Syr. from F. E.

Official name: *Gambir*; Common name: Pale Catechu, Cutch, Terra Japonica; Pharmacopeial definition: A dried extract prepared from decoctions of the leaves and twigs of *Ourouparia Gambir*; Natural order or family: *Rubiaceae*; Habitat: E. I.;

Medical properties: Astringent; Active constituent: Tannin; Dose: 15 grs.; U. S. P. Preparations: Comp. Tr.

Official name: *Cinchona*; Common name: Yellow Cinchona, Calisaya Bark, Yellow Peruvian Bark, Jesuits' Bark; Pharmacopeial definition: The dried bark of *Cinchona Calisaya*, yielding 5% alkaloids; Natural order or family: *Rubiaceae*; Habitat: Brazil; Medical properties: Febrifuge; Active constituents: Quinine, Quinidine, Cinchonine, Cinchonidine, Kinovin, Kinic Acid; Dose: 15 grs.; U. S. P. Preparations F. E. and Tinc.

Official name: *Cinchona Rubra*; Common name: Red Cinchona; Pharmacopeial definition: The bark of *Cinchona Surcirubra*, yielding 5% alkaloids; Natural order or family: *Rubiaceae*; Habitat: Brazil; Medical properties: Febrifuge; Active constituents: Quinine, Quinidine, Cinchonine, Cinchonidine, Kinovin, Kinic Acid; Dose: 15 grs.; U. S. P. Preparations: Comp. Tinc.

Notes.—We have two varieties of Ipecac: the Rio and Cartagena. The roots are about the size of goose quills; color, gray, red and brown, according to age of plant. It is a small, shrubby plant growing in damp, shady woods of S. A. It has small white flowers.

Ipecac is much used as an emetic and is a safe non-depressant one, yet in small doses it prevents vomiting and especially in pregnancy. In very large doses, preceded by Opium, Ipecac is a wonderful drug for severe cases of dysentery.

Alcresta Ipecac is an absorption product of the alkaloids of Ipecac combined with Fuller's Earth (hydrated aluminum silicate).

Cephaeline is the emetic principle of Ipecac, but it is slow in action. Dose, 1/12 grain.

Cinchona was and is one of the most famous of all drugs. It was known probably to the Indians before the arrival of the Spaniards.

Chinchona was named for Countess del Chinchon, wife of the Viceroy of Peru. The Indians of Peru called it "kina" from which "Quina," or the word Quinine, was derived.

Cinchona was first imported into Europe in 1639 by Countess del Chinchon, for whom it was named.

In 1682 one pound of the bark sold for 100 louis-d'or, or about \$400.00.

Cinchona contains about 20 alkaloids, but the most important is Quinine. It also contains Tannic Acid, Kinic and Kinovic Acids and one resinoid known as Kinovin.

Official name: *Glycyrrhiza*; Common name: Licorice; Pharmacopeial definition: Rhizome of *Glycyrrhiza Glabra Typica* and *Glycyrrhiza Glabra Glandulifera*; Natural Order or family: *Leguminosae*; Habitat: Europe; Medical properties: Expectorant; Active constituent: Glycyrrhizin.

Official name: *Santalum Rubrum*; Common name: Red Saunders; Pharmacopeial definition: The heartwood of *Pterocarpus Santalinus*; Natural order or family: *Leguminosae*; Habitat: Europe; Medical properties: Coloring agent; Active constituent: Santalin.

Official name: *Senna*; Common name: *Senna*; Pharmacopeial definition: Leaves of *Cassia Acutifolia* and leaves of *Cassia Angustifolia*; Natural order or family: *Leguminosae*; Habitat: Africa; Medical properties: Cathartic; Active constituent: Cathartic acid.

Official name: *Physostigma*; Common name: Ordeal Bean, Calabar Bean; Pharmacopeial definition: The ripe seed of *Physostigma Venenosum*, yielding 15% alkaloids; Natural order or family: *Leguminosae*; Habitat: Europe; Medical properties: Sedative; Active constituent: Physostigmine; Dose: 1½ gr.

Official name: *Acacia*; Common name: Gum Arabic; Pharmacopeial definition: Gummy exudation from *Acacia Senegal* and other African species of *Acacia*; Natural order or family: *Leguminosae*; Habitat: Africa; Medical properties: Demulcent; Active constituent: Arabic Acid.

Official name: *Tragacantha*; Common name: Gum Tragacanth; Pharmacopeial definition: Spontaneously dried gummy exudation from *Astragalus Gummifer*; Natural order or family: *Legumino-*

sae; Habitat: Africa; Medical properties: Demulcent; Active constituent: Bassorin.

Official name: *Kino*; Pharmacopeial definition: The spontaneously dried juice of *Pterocarpus Marsupium*; Natural order or family: *Leguminosae*; Habitat: E. I.; Medical properties: Astringent; Active constituent: Tannin; Dose: 8 grs.

Official name: *Copaiba*; Common name: Balsam Copaiba; Pharmacopeial definition: An eleoresin derived from South American species of *Cobaiba*; Natural order or family: *Leguminosae*; Habitat: S. A.; Medical properties: Diuretic; Active constituents: Oil and resin; Dose: 15 min.

Official name: *Balsamum Peruvianum*; Common name: Balsam of Peru; Pharmacopeial definition: A balsam obtained from *Toluifera Pereirae*; Natural order or family: *Leguminosae*; Habitat: C. A.; Medical properties: Expectorant; Active constituent: Cinnamic Acid.

Official name: *Balsamum Tolutanum*; Common name: Balsam of Tolu; Pharmacopeial definition: A balsam obtained from *Toluifera Balsamum*; Natural order or family: *Leguminosae*; Habitat: C. A.; Medical properties: Expectorant; Active constituent: Cinnamic Acid.

Notes.—The following unofficial drugs belong to this family: *Haematoxylon*, or Logwood, which is an astringent.

Scoparious, or Broom, and contains the alkaloid Sparteine, and the Sulphate is U. S. P. Sparteine is one of the liquid alkaloids.

Licorice is derived from the Latin word *Liquiritia*, corrupted from Greek *Glykyrrhiza*, meaning sweet root. It is a perennial herb with long, pliant, sweet roots.

Glycyrrhizin is a yellow transparent amorphous substance closely allied to sugar.

There are two official varieties of Licorice and the Spanish is much larger than the Russian.

The Pure Extract of Glycyrrhiza, the Fluid Extract, and the Compound Powder are the U. S. P. preparations. However, the elixir is made from the fluid extract and Brown Mixture contains

the extract. Licorice Extract is the commercial extract seen in glossy black rolls. It is not U. S. P.

Senna was derived from the French word *se'ne'* from *sanaya*, meaning to make easy to open. There are two varieties of *Senna*, *Cassia Acutifolia* or Alexandrian, which is native to Central and Eastern Africa. *Cassia Angustifolia* is known as Indian or Tinnivelly *Senna*, and is the long leaf *Senna*. *Senna* is a shrubby plant growing about two feet in height with bright yellow flowers.

The fluid extract and compound infusion of *Senna* are official.

The best solvent for *Senna* is a mixture of one part alcohol and two parts water.

Physostigma is the only poisonous drug of the family *Leguminosae*. It is the seed of a twining half shrubby plant native of Western Africa. The bean itself is about the size of the horse bean and kidney shaped. It is most soluble in alcohol and less in water. It is used in the form of an emulsion by the natives as an ordeal when persons are suspected of witchcraft. It is believed that if the suspect is not guilty he will not vomit, but if he is he will; the consequence is the ones who are not guilty eat freely and do not vomit, and those who are guilty eat sparingly and do vomit; so you see large doses do not cause vomiting and small doses do.

Physostigmine, which is the alkaloid of *Physostigma*, is known as Eserine, and the Salicylate is official. It is known as Eserine Salicylate and is used to contract the pupil of the eye. In large doses *Physostigmine* acts as a diaphoretic, stimulating the secretions of the saliva and tears, and is antagonistic to Strychnine.

The internal dose of the Salicylate is 1/60 grain.

Acacia comes from a tree indigenous to Africa; it occurs in tears in various size and is insoluble in alcohol but soluble in water. *Acacia* should not be prescribed with acids or strong alcoholic solutions or salts of the heavy metals or Syrup of Squills or Tincture Guaiac, as it produces a blue color with the latter.

Tragacanth is obtained from a shrub which is known as leaf gum and grows chiefly in Asia Minor or Persia. It contains

bassorin which is an insoluble gum and therefore the mucilage must be strained.

Kino is obtained from a tall tree growing in India and Kino contains a large amount of Tannin, which causes a greenish precipitate with persalts or iron. Tr. of Kino is made by special process and must be heated to boiling for one hour then add alcohol and strain through cheese cloth. The heating destroys the enzyme which causes the preparation to gealtinize.

Peru is obtained from a tree. It is a black, thick liquid and with an odor of benzoin or vanilla.

Balsam of Tolu is obtained from a tree of Venezuela and its properties are very similar to Peru. It is a solid.

Official name: *Aspidosperma*; Common name: *Quebracho*; Pharmacopeial definition: The bark of *Aspidosperma Quebracho Blanco*; Natural order or family: *Apcynaceae*; Habitat: Argentine; Medical properties: Sedative; Active constituent: Aspidospermine, Quebrachine; Dose: 6 grs.

Official name: *Strophanthus*; Pharmacopeial definition: The seeds of *Strophanthus Kombe*, assayed biologically; Natural order or family: *Apocynaceae*; Habitat: Africa; Medical properties: Stimulant; Active constituent: Strophthin.

Notes.—*Apocynaceae* is the Dogbane Family and contains Apocynum, which is called Canadian Hemp, but is not U. S. P., belongs to this family.

Aspidosperma is the white quebracho, blanco meaning white. It is a tree and the dried bark is brownish-grey or reddish-brown chips. The alkaloids are valuable to stimulate the respiratory center. It is used for asthma, and in bronchitis. The fluid extract is official.

Strophanthus is a climbing African plant and the word *Kombe* was derived from an arrow poison which the natives made from *Strophanthus* seed. It slows the action of the heart, increases its contractility and increases its arterial tension, though less than digitalis. Its action is more rapid, less protracted and less certain than digitalis and also less diuretic. It is a valuable

cardiac stimulant and is used where for any reason *digitalis* is not advisable.

Strophanthin is a glucocide soluble in water or alcohol. Dose by the mouth 1/60 grain. Intravenous dose, 1/80 grain.

The dose of *Strophanthus* is 1 grain and the tincture is official.

Because of the stability of *Ouabain*, it is used as a standard for comparison in the biologic assay.

Some unofficial drugs: *Krameria-Rhatany*, used as astringent. *Chirata* is India Tonic; it is the plant *Swertia Chirata*.

Official name: *Eucalyptus*; Common name Bluegum Tree; Pharmacopeial definition: Leaves of *Eucalyptus Globulus*; Natural order or family: *Myrtaceae*; Habitat: Australia; Medical properties: Antiseptic; Active constituent: Volatile Oil; Dose: 30 grs; U. S. P. Preparations: Fluid Extracts.

Official name: *Caryophyllus*; Common name: Cloves; Pharmacopeial definition: The flower-buds of *Eugenia Aromatica*; Natural order or family: *Myrtaceae*; Habitat: E. I.; Medical properties: Synergist; Active constituent: Volatile Oil; Dose: 4 grs.

Notes.—*Eucalyptus* is a very large tree and grows abundantly in California making shade trees for the streets. The leaves owe their value to Oil of Eucalyptus, which is a Volatile Oil and contains Eucalyptol. It is a colorless liquid and the dose is 5 minims. Used in the place of Oil of Eucalyptus. The oil yields about 70% of it.

The Myrtle of this family, as the above, is the one that was sacred to Venus as the symbol of youth and beauty.

The Clove tree is a beautiful evergreen tree cultivated in East and West Indies. Cloves enter into Tincture Lavender Co. and Tincture Rhubarb Aromatic. The active constituent of Oil of Cloves is a phenol called Eugenol.

Oil of Cloves is locally an anesthetic and antiseptic. Internally it increases circulation and temperature, aids digestion and relieves pain.

A *Synergist* is a drug which aids the action of another or acts as a corrective.

Pimenta is Allspice and belongs to this order but is not U. S. P.

The Volatile Oil obtained from it is official and it contains 65% Eugenol.

The Bayberry tree, from which is obtained Oil of Bay and from which Spirit Myrciae (Bay Rum) is prepared.

Official name: *Senega*; Common name: *Seneca Snakeroot*; Pharmacopeial definition: The dried roots of *Polygala Senega*; Natural order or family: *Polygalaceae*; Habitat: U. S.; Medical properties: Expectorant; Active constituent: Senegin; Dose: 15 grains; U. S. P. Preparations: F. E.

Notes.—*Senega* is a perennial having small white flowers. Its stem is erect, simple and tufted and grows about one foot high, the roots are woody, branched and about $\frac{1}{2}$ inch in diameter. It is famous as an imaginary cure for snake bite. It is an expectorant diuretic and diaphoretic. The fluid extract enters into Syrup of Squills Comp. and Syrup of Senega.

Official name: *Gentiana*; Common name: Yellow Gentian; Pharmacopeial definition: The rhizome and roots of *Gentiana Lutea*; Natural order or family: *Gentianaceae*; Medical properties: Tonic; Active constituent: Gentianin; Dose: 15 grs.; U. S. P. Preparations: Tr. Comp. Ext. and F. E.

Notes.—*Gentian* was named for an Illyrian king who was defeated by the Romans about 160 B. C. He is said to have been the first to discover the properties of the plant. It is a small plant growing to 3 or 4 feet in height with ovate-oblong leaves, and yellow flowers. It is numerous in the meadows of the Alps at elevations of 3,000 to 6,000 feet.

Gentian contains about 14% sugar and the infusion will undergo fermentation and is much used by the peasants.

Gentian contains no Tannin but it turns iron preparations black, due to Gentisic Acid.

Official name: *Cinnamomum Saigonicum*; Common name: Saigon Cinnamon; Pharmacopeial definition: The bark of an undetermined species of *Cinnamomum*; Natural order or family: *Lauraceae*; Habitat: Saigon; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 4 grs.; U. S. P. Preparation: Tr.

Official name: *Cinnamomum Zeylanicum*; Common name: Ceylon Cinnamon; Pharmacopeial definition: The bark of cultivated trees of *Cinnamomum Zeylanicum*; Natural order or family: *Lauraceae*; Habitat: Ceylon; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 4 grs.

Official name: *Camphor*; Common name: Camphor, Gum Camphor; Pharmacopeial definition: A keytone obtained from *Cinnamomum Camphora*; it is dextrarotary; Natural order or family: *Lauraceae*; Habitat: Japan; Medical properties: Stimulant; Dose: 3 grs.; U. S. P. Preparations: Water Liniment and Spirit.

Official name: *Sassafras*; Pharmacopeial definition: The bark of the root of *Sassafras Verifolium*; Natural order or family: *Lauraceae*; Habitat: N. A.; Medical properties: Carminative; Active constituent: Volatile Oil; Dose: 2½ drs.; U. S. P. Preparations: F. E. and Comp. Fluid Ext.

Notes.—*Ceylon Cinnamon* is a very light shade and thin.

Saigon is a heavy, thick bark.

Oleum Cassiae is Oil of Cinnamon and is obtained from an undetermined species.

Cinnaldehydum is Cinamic Aldehyde, C_9H_8O , is an aldehyde obtained from Oil of Cinnamon. Not U. S. P.

Camphor is the product obtained by the distillation with steam of the chips of *Cinnamomum Camphora*. It is prepared for hypodermic injection by dissolving in Olive Oil.

Official name: *Sinapis Alba*; Common name: White Mustard Seed; Pharmacopeial definition: The seed of *Sinapis Alba*; Natural order or family: *Cruciferae*; Habitat: Europe; Medical properties: Emetic; Active constituent: Volatile Oil; Dose: 150 grains.

Official name: *Sinapis Nigra*; Common name: Black Mustard Seed; Pharmacopeial definition: The seed of *Sinapis Nigra*; Natural order or family: *Cruciferae*; Habitat: Europe; Medical properties: Rubifacient, Emetic; Active constituent: Volatile Oil; Dose: 120 grains.

Notes.—Commercial Mustard is usually a mixture of both seeds colored with Turmeric. Black Mustard is distinguished from

white as they yield upon distillation with steam allyl-iso-thiocyanate, which is the active principle of oil of mustard.

Black Mustard Seed contain a ferment and a glucoside which act on each other in the presence of water and form the volatile oil. White Mustard does not.

Barrasica Japonica is turnip greens and belongs to this family.

Official name: *Sarsaparilla*; Pharmacopeial definition: The roots of *Smilax Officinalis*; Natural order or family: *Liliaceae*; Habitat: C. A.; Medical properties: Alterative; Active constituent: Parillin; Dose: 30 grs.; U. S. P. Preparations: F. E. and F. E. Co. P.

Official name: *Veratrum Viride*; Common name: Green *Hele-bore*, American *Hele-bore*; Pharmacopeial definition: Rhizome and roots of *Veratrum Viride*; Natural order or family: *Liliaceae*; Habitat: U. S.; Medical properties: Sedative; Active constituent: Nervine; Dose: 1 gr.; U. S. P. Preparations: Tr. and F. E.

Official name: *Scilla*; Common name: Squill; Pharmacopeial definition: The fleshy inner scale of the bulb of the white variety of *Urginea Maritima*, assayed biologically; Natural order or family: *Liliaceae*; Habitat: Europe; Medical properties: Expectorant, Cardiac; Active constituents: Scillin, Scillipicrin, Scillitoxin; Dose: 1½ grs.; U. S. P. Preparations Vin., F. E., Tr.

Official name: *Colchici Cormus*; Common name: *Colchicum* Corm; Pharmacopeial definition: The Corm of *Colchicum Autumnale*, yielding .35% Colchicine; Natural order or family: *Liliaceae*; Habitat: Europe; Medical properties: Anti-rheumatic; Active constituent: Colchicine; Dose: 4 grs.; U. S. P. Preparations: F. E.

Official name: *Colchici Semen*; Common name: *Colchicum* Seed; Pharmacopeial definition: The dried seed of *Colchicum Autumnale*, yielding .45% Colchicine; Natural order or family: *Liliaceae*; Habitat: Europe; Medical properties: Anti-rheumatic; Active constituent: Colchicine; Dose: 3 grs.; U. S. P. Preparations: Tr., F. E.

Official name: *Aloe*; Common name: Aloes; Pharmacopeial definition: The inspissated juice of the leaves of *Aloe Perri*, yield-

ing Socotrine Aloes, or *Aloe Vera*, yielding *Curacae Aloes*, or *Aloe Ferox*, yielding Cape Aloes; Natural order or family: *Liliaceae*; Habitat: Africa; Medical properties: Cathartic; Active constituent: Aloin; Dose: 4 grs.; U. S. P. Preparations: Tr. and Pil.

Notes.—*Convallaria* is Lily of the Valley, belongs to this order. It is not U. S. P. Asparagus and Onion belong to this order, but not U. S. P.

There are three kinds of Sarsaparilla: the Mexican, the Honduras, and the Jamaica, the latter two being the ones most common in commerce. It is a woody vine with prickly stems. The American varieties are shrubs with heart-shaped leaves.

Veratrum is known as itchweed, a common plant growing from Canada to Alabama in wet soil. It is an insecticide and acrid poison. Norwood's Tr. of *Veratrum* is 50% strength and the U. S. P. Tr. is 10%.

Colchicum is a weed-like plant with pale purple flowers, the seed are round, brown and a little larger than mustard seed. It is a powreful gastro-intestinal irritant and heart depressant.

Squill is seen on the market in narrow horny pieces about two inches in length with a yellowish white color. The powder usually comes on the market in one-ounce bottles and must be kept tightly sealed as it is very hygroscopic.

Scillin is the expectorant and emetic principles, and *Scillipicrin* and *Scillitoxin* the cardiac principles.

Aloes grow chiefly in the Mediterranean region, Western Asia and South Africa. Fifty miles from Cape Town is a mountainous country completely covered with Aloe, and the hills on the west side of Socotra, which is a British Island of the Indian Ocean, is where Socotrine Aloes grow. The species grow from half foot to 30 feet in height with very large, juicy leaves. The native negroes make sacks and cords and nets from the fibers of the leaves.

Insipissated means drying.

Aloe was known to the ancients as it was spoken of by Dioscorides, a materia medica writer of the first or second century.

Purified Aloes was made by melting Aloes by heat then adding alcohol and strain.

Allium is Garlic; it is not U. S. P. but belongs to the *Liliaceae* family. *Syrupus Alli* is Syrup of Garlic.

Official name: *Taraxacum*; Common name: Dandelion; Pharmacopeial definition: Rhizome of *Taraxacum Officinale*; Natural order or family: *Compositae*; Habitat: U. S.; Medical properties: Tonic; Active constituent: Taraxacin; Dose: 150 grs.; U. S. P. Preparations: Ext. and Fluid Extract.

Official name: *Pyrethrum*; Common name: Pellitory Root; Pharmacopeial definition: The dried root of *Anacyclus Pyrethrum*; Natural order or family: *Compositae*; Habitat: N. A.; Medical properties: Sialagogue; Active constituent: Pyretherine; Dose: 30 grs.; U. S. P. Preparations: Tr.

Official name: *Arnica*; Common name: Mountain Tobacco; Pharmacopeial definition: The flower-heads of *Arnica Montana*; Natural order or family: *Compositae*; Habitat: Europe; Medical properties: Vulnerary; Active constituents: Arnicine, Trimethylamine; U. S. P. Preparations: Tinct.

Official name: *Grindelia*; Common name: *Grindelia*; Pharmacopeial definition: Leaves and flowering tops of *Grindelia Camporum*; Natural order or family: *Compositae*; Habitat: U. S.; Medical properties: Anti-spasmodic; Active constituent: Resin; Dose: 30 grs.; U. S. P. Preparations: Fluid Ext.

Official name: *Lactucarium*; Common name: Lettuce Opium; Pharmacopeial definition: The dried milk juice of *Lactuca Virosa*; Natural order or family: *Compositae*; Habitat: Europe; Medical properties: Hypnotic, Sedative; Active constituent: Lactocin; Dose: 15 grs.; U. S. P. Preparations: Tinct. and Syr. from Tr.

Official name: *Matricaria*; Common name: German Chamomile; Pharmacopeial definition: The flower-heads of *Matricaria Chamomilla*; Natural order or family: *Compositae*; Habitat: Europe; Medical properties: Tonic; Active constituent: Vol. Oil; Dose: 240 grs.; U. S. P. Preparations: None.

Notes.—The family *Compositae* is that of angiosperm plants. The Artichoke, Chicory and Tansy belong to this family.

Eupatorium is known as Bone Set and used in the form of a

hot tea produces perspiration, and is said to relieve rheumatism, influenza, etc.

Burdock or *Lappa*, used as an alterative, is cultivated in Japan and used as a condiment in the form of soup.

Santonica is known as Levant Worm Seed and contains Sontoin. It gets its common name as Levant was used to designate the eastern part of the Mediterranean Sea where this plant grows.

Anthemis, which is eight times larger than German Chamomile, is known as the Roman Chamomile. It is light in color.

Calendula, or Marigold, is used as a vulnerary and especially diseases of the scalp.

Echinacea, known as hedgehog, is used by the Eclectics as an alterative. And last but not least, *Absinthium*, known as Wormwood and contains a volatile oil, which when mixed with Oil of Anise and other herbs and whiskey, forms the famous French drink known as Absinthe, are all unofficial drugs belonging to this famous family.

Notes of the U. S. P. drugs of this family:

Taraxacum received its name from its leaves as they resemble lion's teeth. The roots are ground and used to adulterate coffee.

Pyrethrum flowers are used as insect powders and to kill flies by asphyxiation.

Arnica grows to about two feet in height and the tincture is very good for indigestion. It is 20% strength.

Grindelia was named for a Russian botanist. It grows in California, has yellow flowers and the fluid extract is considered good for poison ivy.

Lactucarium is a very mild hypnotic. It is Lettuce but differs from the garden Lettuce in having prickly leaves and a black, smooth seed.

AN ADDRESS DELIVERED BY DR. MAX MORRIS TO THE GEORGIA PHARMACEUTICAL ASSOCIATION

American Pharmacy was recognized as being the most advanced Pharmacy even before we had any pharmacy laws at all,

and the members of the craft were competent and safe men then.

Pharmacy is essentially a business, with a slight admixture of professionalism. Pharmacy at best is scarcely more than semi-professional.

As a matter of fact there was never such a condition of pharmacy to make it necessary to invoke the passage of protective laws for the public against pharmacists.

To a certain extent the passage of these laws was favored by some colleges in the hope that it would lead to increased numbers of students.

There was a time when a young man with ambition could work in the day time and study at odd hours or even at night, and qualify himself for higher things than nature seemed to have in store for him at birth. Many of the most illustrious men in America in business, as well as in the professions, in the past as well as among those now living, were and are such self-made men, and nowadays we have an un-American habit imported along with a lot of other foreign curses "there ought to be a law"—whenever things do not come their way of wishing; and the law is invoked for every trifling discomfort until finally the law becomes the greatest of all discomforts and oppressors. Not only is this the case in the trades unions, but even pharmacists are falling into this vicious habit of thinking. There ought to be a law. All men ought to have equal opportunities before the law. The young man who works all the day perhaps because he must support or help to support invalid or aged parents, or a widowed mother with younger brothers and sisters, who cannot take the time or spare the money necessary to go to a college of pharmacy and spend two years, ought to have the right to spend his available time in study, and when he comes before a State Board of Pharmacy he should not be discriminated against because he did not get his knowledge in the one particular way dictated by a law instigated by what is practically threatening to become the Trades Union of Pharmacy.

Professor Oldberg said "It must not be forgotten that the sole warrant for any pharmacy law is the proper protection for the

public health. The welfare of the people must be considered first in any such law, and if that self-evident truth is ignored pharmacy legislation must be a fraud or a failure and will not stand. If the welfare of the people is really the object of the law, it ought to be immaterial to the State, the public, the law if you will, whether a man studies at home with or without a correspondence course, or whether he went to a college of pharmacy for two years, or whether he learned what he knows at night or by day, or whether he ever went to a college with more or less professors or whether he ever went to any school whatsoever, provided that only some how, some where and at some time he qualifies himself to pass the required examination to prove his fitness to be a druggist and thereby his safety as regards the public. Any demands by the law further than to examine him for his fitness must be a fraud, according to Professor Oldberg and to common sense.

If practical experience is required, the State Boards of Pharmacy ought to inquire into this subject and not the colleges. This would not prevent Boards of Pharmacy from recognizing the diplomas of reputable Colleges of Pharmacy in lieu of the theoretical part of the examinations, but they should themselves test the practical qualifications of all applicants and ascertain the experience records, and they could still make proper rules in regard to what shall constitute a College of Pharmacy in good standing for the purpose of giving credit to graduates for their theoretical education. There should be a square deal all around and justice to the public, and I believe that this means that we should not bar a young man from entering pharmacy because he was too poor to attend a College of Pharmacy.

Not very many years ago practically every State that had a pharmacy law exempted graduates of colleges of pharmacy from examination by the Board of Pharmacy. But as the years went by, it was discovered that the college diploma was not a proper criterion of the fitness of the pupil to practice pharmacy, and the examination by the Board of Pharmacy is now obligatory in nearly all the States, and to cite a very recent law, that is, of

Alabama, the requirements for the applicant who applies for registration is that he must show written evidence of four years of practical experience, or be a graduate of a reputable College of Pharmacy, and have two years of practical experience.

The Board of Pharmacy examination should be in every case the final test of the qualification of the candidate for registration. If the changing times demand that the qualifications of the candidate be higher, then let the board make the examination more severe. To decide upon what shall be the proper amount of knowledge which the candidate for registration must possess is well within the proper sphere of the board or would become a proper subject for legislation, but legislation providing that there must be only one way by which the student might acquire the necessary amount of knowledge would be a monstrosity, a monumental absurdity.

The primary objections to the legislation making the possession of a college diploma an indispensable condition to an examination before a Board of Pharmacy are as follows:

First. Such a condition is a manifest injustice to the men who may possess the requisite qualifications for the practice of pharmacy and who have, therefore, an adherent right to appear before an examining board to prove such qualifications and secure registration. To compel a qualified applicant to spend two years in a college of pharmacy would be an unnecessary hardship which no plea in behalf of any institution could justify or extenuate. Where or how a man obtains his knowledge, whether under the stress of a pinching poverty in an attic over some drug store, or in an atmosphere of wealth in some luxuriously appointed college; whether under the tutorage of some master in pharmacy, or under that of the modest druggist in the country drug store, is not the concern of any college or any board, or even of the State; the question is, has he the qualifications? If so, he has a right to prove them and obtain the requisite license. If it be said that such qualifications can be acquired only through a college of pharmacy course, the contention would be equivalent to denunciation of the vast majority of the pharmacists in this State now

engaged in the practice of pharmacy as men unfit for their calling.

Second. To deny any man the right to appear before a board for examination until he can produce a college diploma, is to divest the boards and the State of the right to pass on the preliminary qualifications of a candidate for registration, and to lodge the power in private institutions. The parties in interest in all legislation are the people, and the people's organized representatives, the State, and from the State, therefore, properly flows supreme authority. As the agent of the State, the pharmacy board is properly vested with the jurisdiction over things pharmaceutically, with powers which cannot with justice be delegated to any private institution.

For a State to declare that a board shall not examine into the qualifications of men for the practice of pharmacy until those qualifications have first been passed upon by some college or university would be to tie the hands of the board and degrade it to the rank of an inferior. If the boards, through their examinations or otherwise, are unable to pass on the qualifications of applicants for registration, then let them go out of the examining business entirely, and let the pharmacy laws be abolished, for in such case the great mass of legislation relating to pharmacy would be mere pretense and hollow presumption.

The diploma condition is an insult to the intelligence of any board confronted with the requirements. Let the board remain supreme. Give the son of a poor man an equal chance in the race of life with the son of the rich or the well-to-do. Let the true merit prevail and not a mere certificate of alleged education.

A poison is a substance capable of producing effects which are dangerous to life.

Cumulative poison is one that increases suddenly in its action after slow addition. Ex., Digitalis.

A chronic poison is produced by taking small doses from time to time. Ex., Lead.

An irritant poison is one that causes irritation of the stomach. S. Flies.

Deliriant poison is one which acts directly on the brain. Ex., Cocaine.

A local poison is one that acts directly upon the part of the body the poison comes in contact. Ex., Caustic effects of mineral acids on the stomach.

A systemic poison is one which acts on the circulation.

A true poison is one which when absorbed by the system uniformly causes disease or death. Ex., Strychnine, Atropine. Matters not how well diluted.

A corrosive poison is a highly irritant and causes local destruction of tissue.

A neurotic poison is one which acts chiefly upon the nervous system. Although well diluted with water, it continues to be poisonous. In a sense it is a true poison.

Tetanus are agents which act directly upon the spinal cord, producing such spasmodic and continual contraction of muscles as results in stiffening or immobility of the parts to which they are attached. These spasms last from one to five minutes, followed by complete relaxation at intervals. Example, Nuxvomica.

Example of inorganic volatile non-metallic poisons: Bromine, Chlorine, Iodine, Phosphorous.

Example of metallic poisons: Antimony and its salts, Arsenic, Lead, Mercury.

Example of mineral acids: HBr , HCl , HNO_3 , H_2SO_4 .

Mineral alkalies: Ammonia Potassium and Sodium Hydroxides.

Organic Poisons: Volatile Organic Poisons, Alcohol, Acetanelid, Aniline and its derivatives, Antipyrine Phenacetine, etc.

Benzine and its derivatives, including Carbolic Acid, Creosote, Picric Acid, Chloral Chloroform Spartine, HCN .

Alkaloids: Aconitine, Apomorphine, Morphine, Strychnine, Cocaine.

Example of Bacteria Poisons: Food poisons, Ptomaines; Septic poisons, Toxins.

Organic Acid Examples: Oxalic Meconic, Oxalic.

An antidote is a substance capable of counteracting the effects of a poison.

A Physiological Antidote is one which produces systemic effects contrary to the poison. It acts directly on the functions of the body opposite to the poison. Ex., Atropine is the physiological antidote for Morphine and Opium.

Artificial Respiration is raising and lowering the arms over the head 18 times a minute.

A Chemical Antidote is one which acts directly upon the poison by uniting with it and forming an insoluble compound or destroying it and rendering it harmless. Example, oils, soaps, acids, egg, etc.

A Mechanical Antidote is one which removes the poison without changing it, or coats the stomach so the poison cannot reach it. Use of stomach pump.

Emetics are agents which produce vomiting. They are divided into two classes. Local emetics produce their effect by the irritation of the end organs of the gastric nerve. Systemic or general emetics produce their effect through the medium of the circulation. The emetic action is due to the direct stimulation and irritation of the vomiting center of the medulla.

The hypodermic dose is half that by the mouth; the rectal or vaginal, twice that by the mouth.

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